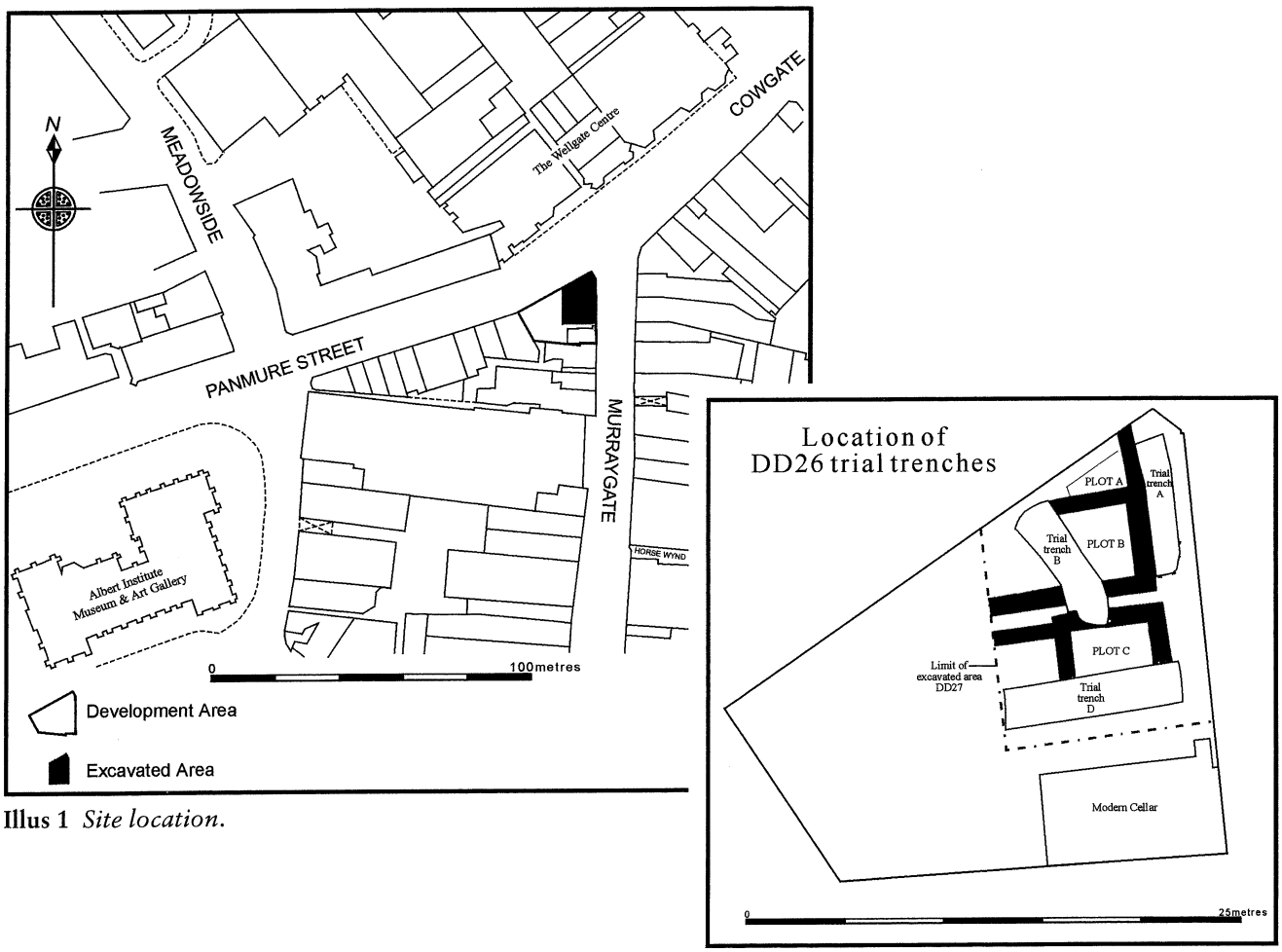


Illus 1 *Site location.*

Illus 2 *Excavation in progress.*

Excavations at 27–35 Panmure Street / 72–8 Murraygate, Dundee

Graeme Brown and Mike Roy

with contributions by Ruby Cerón-Carrasco, Adrian Cox, E Patricia Dennison, Dennis Gallagher, Derek W Hall, Mhairi Hastie, Timothy Holden and Catherine Smith

Location and description (Illus 1 and 2)

The site (NO 403 305) lies in the centre of Dundee at the junction of Panmure Street and Murraygate, the latter being one of the main shopping thoroughfares of the modern town (McKean and Walker, 1993, 39). Until the start of the recent redevelopment the site was occupied by a late 19th- and 20th-century commercial building, used by 'Next'.

Within the medieval burgh the site was at the northern edge, close to the Murraygate Port, one of the principal gateways into the burgh from the north. Murraygate, on record since the 13th century, was one of the wealthiest suburbs of medieval Dundee (Stevenson and Torrie, 1988, 77). In 1592 a defensive wall was erected around the burgh, a stretch of which is thought to exist immediately to the north of the site, following the line of the present day Panmure Street (Torrie, 1990, 101–103).

A number of streets in Dundee, including Murraygate, were widened during the 18th and 19th centuries (Stevenson and Torrie, 1988, 4), and it was possible that original medieval street frontages might lie under the present surface. This opportunity for investigation of the Murraygate was important, as redevelopment since the 18th century had much reduced the areas in which medieval archaeology might survive, while relatively little archaeological investigation has taken place in Dundee (Stevenson and Torrie, 1988, 4)

The development

The demolition of the existing standing building occupied by the retailers 'Next', and the construction of a new structure prompted an archaeological response in accordance with NPPG 5 and PAN 42. Dundee Council informed the developer in November 1997 that it lay in an area of potential archaeological interest. The foundation design for the new building, consisting of piles driven deeply into the underlying substrate, posed a serious threat to archaeological deposits and features not already disturbed by modern cellars. To ascertain the possible consequences of the development for archaeology an evaluation exercise was required. This, and the resulting archaeological work, was commissioned by Douglas McConville Partnership on behalf of their client Scottish Mutual Portfolio Managers who were redeveloping the site. SUAT carried out a desk-based assessment of the site in January 1998, and this led to trial trenching of the area and a full excavation in November and December of the same year.

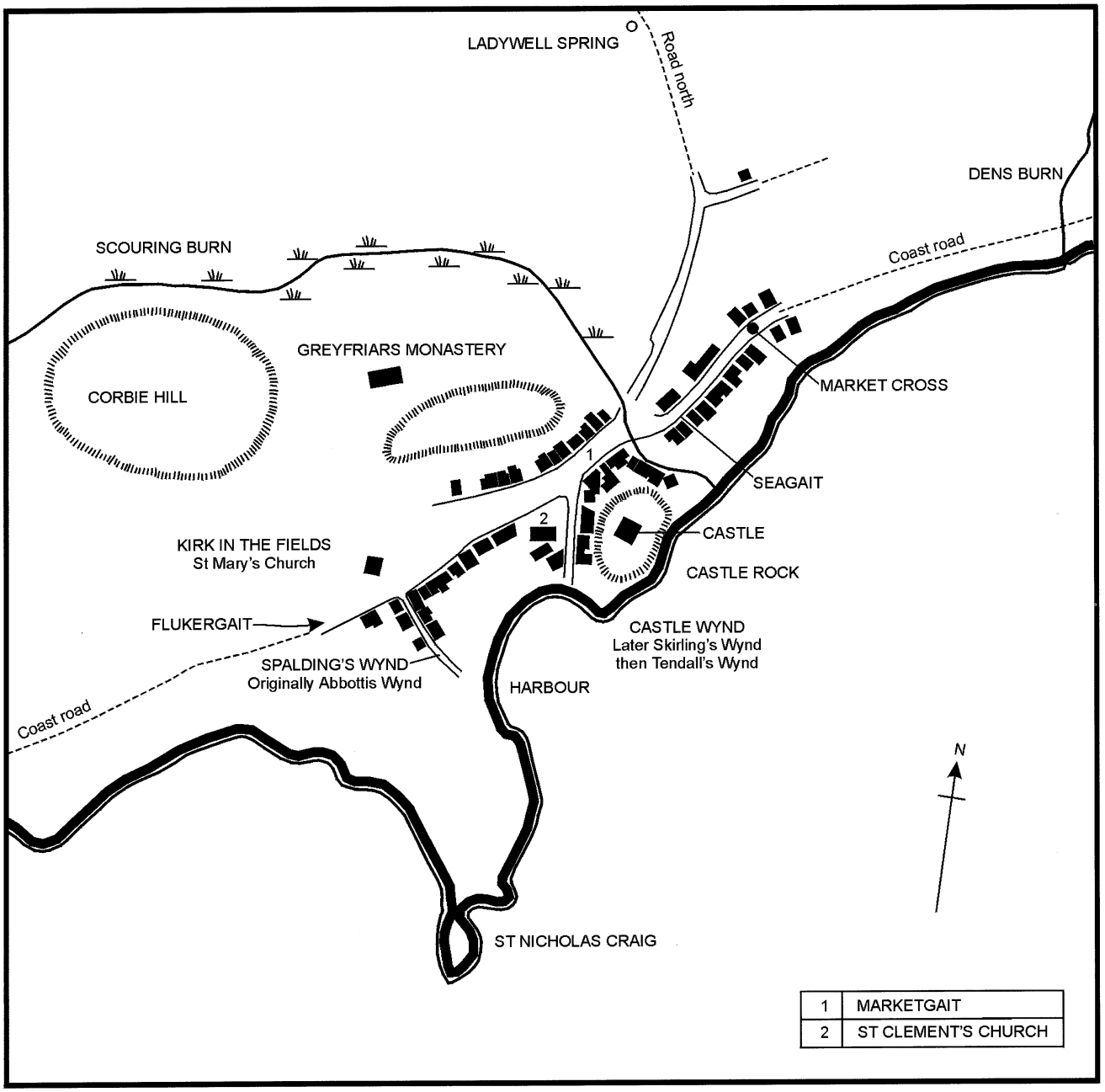
Historical background

E Patricia Dennison

The site in the Middle Ages

This site lies close to the historic core of early medieval Dundee, which was granted burghal status in the reign of William I (1165–124) and was subsequently placed under the superiority of the king's brother, David, earl of Huntingdon (DCA, CC1, no.16). The town had been a place of some importance long before this time: the chroniclers John of Fordoun (Skene, 1871, i, 227) and Andrew of Wyntoun (Skene, 1872, v, 605) indicate that, even by the end of the 11th century, Dundee was one of the favoured residences of the Scottish crown, in the person of Malcolm Canmore, whose son, Edgar, reputedly died there in 1107. Some 19th-century historians even claim that the settlement was an 'old town' by 1054 (Lamb, 1895, 2).

It is thought that the earliest commercial core of the town was in Seagate, where the market cross was located. Access from Murraygate to the Seagate was facilitated by small wynds—Prattis Wynd and Horse Wynd (Illus 3). The significance of the position of the Dundee market for the site under investigation is crucial; as being so close to Seagate, Murraygate was set in the core of early medieval settlement. Equally importantly, the site was a mere 400 small paces from the Castle of Dundee, the administrative focal point of the burgh and home of royalty. Murraygate was also the main route north to Forfar, a very important royal burgh at this time, and also to the Ladywell, one of the primary sources of fresh water in the Middle Ages. For all of these reasons, it is to be expected that the street would have been cobbled quite early in its history and that the occupants of this medieval site would have been relatively important, and certainly of the burgess class. Indeed, a list of inhabitants here in the early 15th

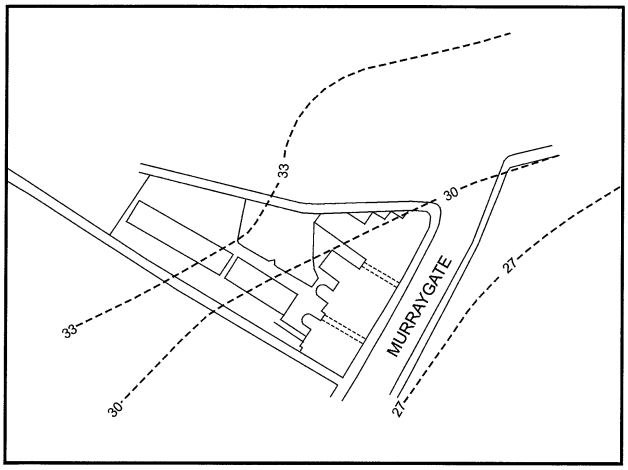


Illus 3 *Dundee in the 13th century (Copyright E P Dennison).*

century includes the burgh provost, the town's principal officer (Lamb, 1895, xlvi). It would therefore be reasonable to assume that the dwellings placed on this site would have been better quality housing; and this is supported by some of the rentals which were diverted to the parish church (Lamb, 1895, xlvi). Although the focus of the town shifted westwards (Torrie, 1990, 51–55), with the town weighing machine, or tron, being placed in Marketgait (the High Street) by 1364 and the cross and tolbooth being re-erected there soon after (Torrie, 1990, 26–27), Murraygate's status as the principal exit route to the north ensured that it remained one of the important thoroughfares of the burgh throughout the Middle Ages and into modern times.

Even though there had been settlement in Dundee for some considerable time before the end of the 12th century, there was probably a formal planning of the town after the granting of burghal status, as was the practice in other burghs. This meant that burgage plots were measured out and delineated along the major thoroughfares, of which Murraygate was undoubtedly an example. We can be certain that this process began very early in burghal life in Dundee, as Earl David granted a burgage plot, or toft, to the Abbey of Lindores in 1190x1195 (*RRS*, ii, 358).

The first known survey to detail contour lines of the burgh is Collie's 1:2500 survey of 1851 (Illus 4), which reveals the falling nature of the site, even though it had to some extent been levelled by the time of the survey through the raising of height of the thoroughfare. Being also in close proximity to marshy land, which came to be called the Meadows, the site under discussion would inevitably have to deal with major drainage problems.



Illus 4 *Contours from Collie's 1:2500 survey of 1851 (Copyright E P Dennison).*

Behind the buildings at the frontage of the street were the 'backlands' of the burgage plots where the burgesses kept their animals, grew vegetables, built their baking ovens, sank wells and midden pits and carried on small scale industrial activities, often in temporary structures. In time, congestion at a prime site often led to repletion, or building in the backlands.

Medieval Dundee like the vast majority of Scottish medieval towns was delineated by a ditch and wooden pallisading. There were official ports, or gates, through which visitors were required to enter the town and at which tolls were paid for using the town's market. The main port on Murraygate lay across the road immediately to the north of, or just beside, the site under investigation. Normally, burgage plots ran in a herring-bone pattern back from the street front to the rear of the town's boundaries, which were themselves enclosed with the ditch and pallisading at the 'heid dykes'. The site of the excavation is interesting, in that the most northerly burgage plot ran in effect east–west along the extent of the burgh boundary, producing an extra burden on the burgess occupying this plot, as he was required to reinforce the full length of his burgage plot, rather than merely the end.

The site in Early Modern times

This area of the Murraygate saw significant changes during the second half of the 16th century. According to the town records, a decision was made in January 1569 that the Murraygate Port should be repaired, possibly as a result of the effects of the English invasion of 1547. In 1553, the town council resolved 'to mend the calsays [cobbled ways] broken in the time of the subversion of the burgh', *i.e.* the English invasion (Maxwell, 1891, 110). To effect repair to the Murraygate port, a house was demolished and the owners were compensated with an annual payment until the house was rebuilt, with the guarantee that the rebuilt house would be as good as that which had been knocked down (Maxwell, 1884: quoting Burgh Records, 21 January 1568/9). This property probably stood immediately to the north of the site under discussion, but it is just possible that the demolished tenement sat within the north end of the site. Whatever the truth, the fact that the council was willing to offer quality assurance is an indication of property of a certain substance here.

By the 16th and early 17th centuries the burgh's prosperity was mirrored in the substantial dwelling houses built for the wealthy merchants of the community, many of which were of stone in traditional Scottish style with crow-stepped gables and turreted stairs, but also manifested the influence of building techniques from the continent, in particular Germany and the Low Countries. Wood was still used in the construction of these better houses, most notably for panelled walls in the interiors and for stairs and booths. It is unlikely that native wood was used for such buildings: the constant references to import of timber from the Baltic in the Burgh Records and in Wedderburn's 'Compt Book' indicate that Dundee was dependent on overseas timber.

One of the most visible changes to the townscape at the end of the 16th century was the erection of a stone wall surrounding the town on the landward side, with a heavy investment by the town in both labour and funds. The wall followed the traditional town delineation, running from the river to the ports already in existence (Torrie, 1990, 101–102), which would have led to the property at the north of the site becoming for the first time protected by a substantial stone wall along its east–west boundary. Slezer's late 17th-century views of Dundee show the site under investigation to have been occupied by substantial stone buildings.

The 18th century

Murraygate was described in 1776 as:

> a fine street. Very broad and the street may be said to be almost new built from end to end, with stately stone buildings that make goodly appearance. The Broad part of the street (where the site under discussion lies) is vastly well, and it has a stone fountain just as they enter the narrow part of the street, supplyed with water from the Lady Well (Millar, 1776, 179–180).

Roy's military map, drawn in the 1750s indicates graphically the importance of this street, although it does not demonstrate the variation in the street's width. The lower third, leading from the High Street to the Dog Well was called the 'Narrow' of Murraygate, being no wider than eighteen feet, while to the north, where the site stood, was the Broad of Murraygate, which varied in width from forty to sixty feet.

Most of the properties in Murraygate are at this time wooden fronted, with stone portions set back approximately six feet from the street line and wooden fronts that were supported on pillars, forming an open area underneath like a piazza. In 1756 these were described as 'affording a dry walk in wet weather', but such wooden frontages soon disappeared and by 1822,

Illus 5 *'Our Lady Warkstairs'.*

there were only seven or eight in existence (Lamb, 1895, xlvib). One that did remain standing was 'Our Lady Warkstairs' in the High Street. Behind its 19th-century façade lay a pillared walkway (Illus 5), which gives a good illustration of the types of properties in Murraygate.

Murraygate was not occupied solely by private residences, as the street was also the centre of the dyers craft for several centuries—according to the Dundee Register of 1783, the deacon, boxmaster, and officer of the craft as well as most of the craftsmen had their dyeworks and business premises in this quarter of the town (Lamb, 1895, xlvii).

The 19th century

This century brought the full effects of industrialisation to Dundee as the town was transformed into one of the major cities of modern industrial Scotland, and Murraygate and its backlands became overrun with brewers, tanners and mills (McKean and Walker, 1984, 38).

Murraygate was not immediately hit—a sale notice for a property on the west side of Murraygate in 1808 described a 'tenement of land with the enclosed garden and summer house on the west side. The garden is well stocked with fruit trees and an excellent well'. Another property also enjoyed these features—'A large house, neatly fitted up for a tavern in the Broad of the Murraygate, large garden, well stocked with fruit trees and bushes and a well within the premises' (Anon, 'Notes on the streets of Dundee'). Interestingly, the rear of properties in the Murraygate, which abutted onto the town wall were described as being 'waste and burned' in the early years of the century (Lamb, 1895, xlvic). This may mean that the properties behind the frontages of the site under consideration were in a very poor condition.

Improvements were essential, but Murraygate had to wait for change. While the 1858 Ordnance Survey map, which was revised in 1871, indicated no alterations on the site at the north end of Murraygate, the 1902 OS map was to reveal that finally improvements had been made on the site.

The 20th century

The 1925 Housing (Scotland) Act required inspection of dwelling houses, providing records which give an interesting insight into the properties on the site under investigation. 78 Murraygate (also called 33 and 35 Panmure Street) was inspected on 6 April 1933 and subsequently on 23 December 1937 and was found to be a house of three storeys, with attics, with external walls of stone and cement faced and roof of slate. It was built right up to the thoroughfare, with no space in front and no free space at all to the rear, and no portion of the house below ground level. The ground floor was used as shops, the first as showrooms and the second as a workshop.

Numbers 72, 74 and 76 Murraygate were inspected on 8 March 1926. Number 74 functioned as a pend leading to the rear of the properties. They also were found to be of three storeys in height, with attics and no cellars, and no free space to the front or the rear. Their structure was deemed to be good, the external walls being of stone and the roofs slated. The ground floors functioned as shops, the first as office and workrooms, the second had two rooms (presumably let out) and the attics were used as 'cellars', presumably for storage. When inspected again on 6 April 1933, the second and third floors were business premises, the

ground floor being two shops (DCA, Cards recording Inspection of Dwelling Houses).

Historical notes

The historical report is based on research into primary documentary sources undertaken in Dundee City Archives, University of Dundee Archives and the Central Library Dundee. Cartographic analysis was undertaken at the Dundee Archives and the Map Library, National Library of Scotland.

For a fuller understanding of the site within its contemporary social and economic setting a number of secondary sources may be consulted. The most recent publications include:

Stevenson, S and Torrie, E P D 1988 *Historic Dundee: the Archaeological Implications of Development*, Scottish Burgh Survey (Glasgow/Edinburgh).

Torrie, E P D 1990 *Medieval Dundee, a Town and its People*, (Dundee).

Whatley, C A, Swinfen, D B and Smith, A M 1993 *The Life and Times of Dundee*, (Edinburgh).

Archaeological background

Mike Roy and Graeme Brown

The redevelopment of much of the centre of Dundee in the past 250 years has been detrimental to the survival of archaeological material there (Mackenzie 1998, 181)—the 20th-century Wellgate shopping centre development lies just to the north of the site. Therefore one of the major concerns of the excavation was whether any material had survived the 19th-century development of the area. Two small-scale trial excavations carried out by SUAT in the immediate vicinity of the site provided the most useful guide to the archaeological potential of this part of medieval Dundee. Both excavations discovered substantial evidence of medieval activity, although unfortunately on neither occasion were building frontages located for investigation, as there have been no previous opportunities to investigate the Murraygate frontages.

At 62–68 Murraygate, two properties south of the present site, three small trenches uncovered a medieval oven and associated floor surfaces (Bowler 1988). The floor surfaces were strewn with ash and charcoal suggesting that they may have been within an outbuilding or enclosed yard. A single test pit within a back courtyard at 71–75 Murraygate, directly opposite the present development, discovered made ground to a depth of 1.3 m below the ground surface. Artefacts recovered from the lower levels of this infill suggested the presence of midden spreads typical of medieval backlands. Most importantly, this work found depths of deposit sufficient to perhaps allow survival of archaeological evidence right up to the street frontage (Hall 1989).

Trial excavations were carried out on the 'Next' site in November 1998 (DD26) following the demolition of the commercial building there (Brown 1998). Four trial trenches were opened by machine and then were excavated by hand. The trial work identified an archaeologically productive area in the north-east of the site in the corner formed by the junction of Murraygate and Panmure Street. A cobbled layer was uncovered to the east, representing an early Murraygate surface, and walls were seen to front onto this. Deposits probably related to the medieval occupation of the area were found, and to the north a large wall was uncovered, then interpreted as perhaps relating to the town's 16th-century defences. In the west of the site the existence of a raised beach brought subsoil close to the surface, thus reducing the chances for survival of archaeological deposits. A 19th or early 20th-century stone-built cellar, clearly visible following the demolition of the standing building, had removed all archaeology towards the south of the development.

Thus excavation in this area had already demonstrated the survival of evidence for medieval occupation and industrial activity. It was also likely that the present excavations might locate medieval frontages, buried under 18th-century or later deposits.

The excavations

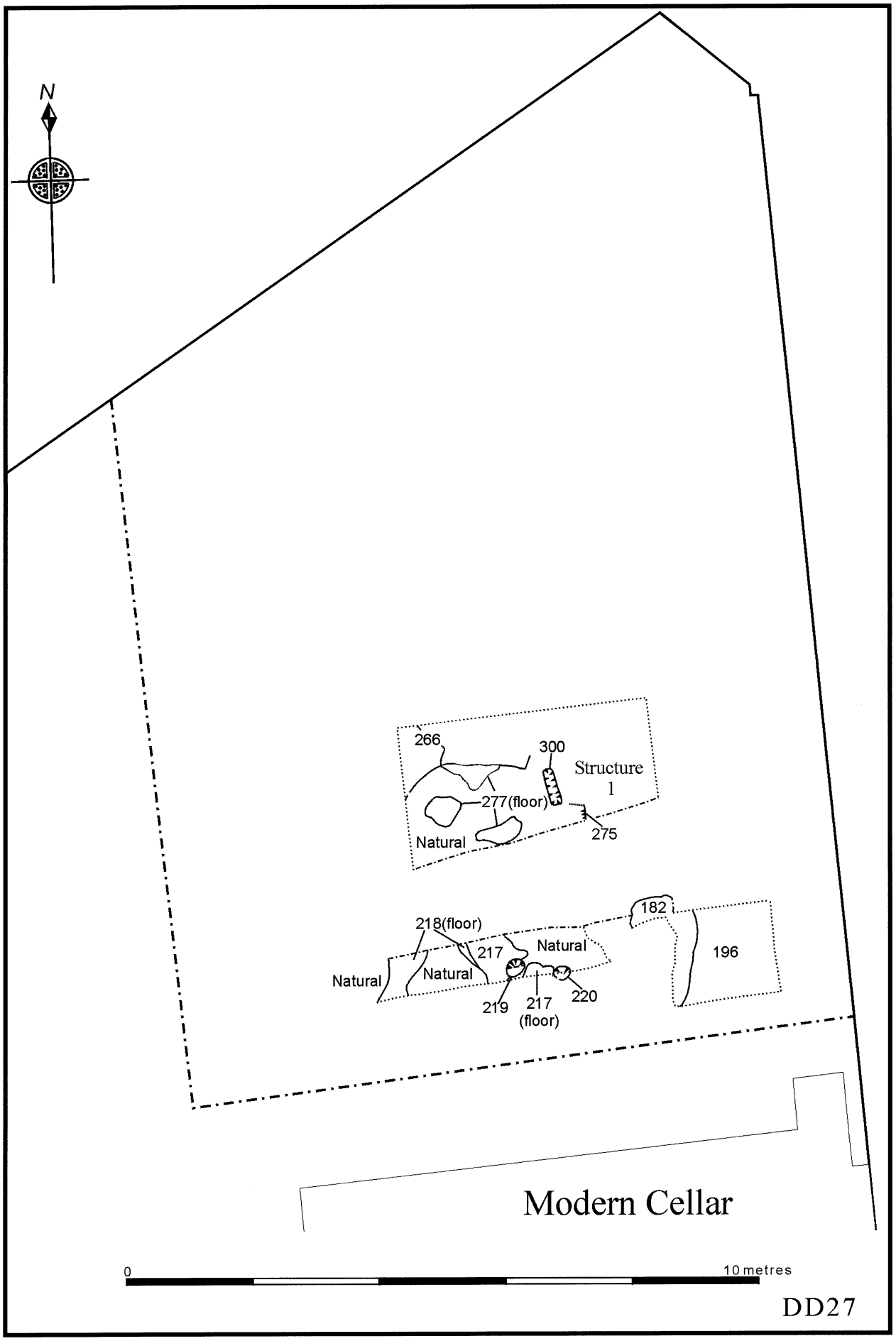
The trial excavations noted above led on almost immediately to a full excavation carried out by a team of five people over three weeks from 30th November to 18th December 1998. The main excavation focused on the area to the north-east of the development because of time constraints and the fact that preservation was likely to be better there than elsewhere. The excavation (site code DD 27) was directed by Graeme H. Brown of SUAT. The area of excavation measured approximately 10m east–west by up to 15m north–south.

Five broad phases of activity (1–5) were identified, the first four of these relating to medieval activity spanning some 300 years from the 12th to the 14th or 15th century. Both Phases 3 and 4 were subdivided into a and b sub-phases, 3b relating to modifications in existing features or the raising of the street level, while 4a represented a discrete building period in plot 'C'. Three property plots, designated 'A', 'B' and 'C', had all been laid out by phase 3a and within these eight buildings were identified, referred to as Structures 1 to 8. Structure 1 was the earliest, 12th-century, timber building, while Structures 7 and 8 were stone buildings of the 19th or 20th centuries (Phase 5).

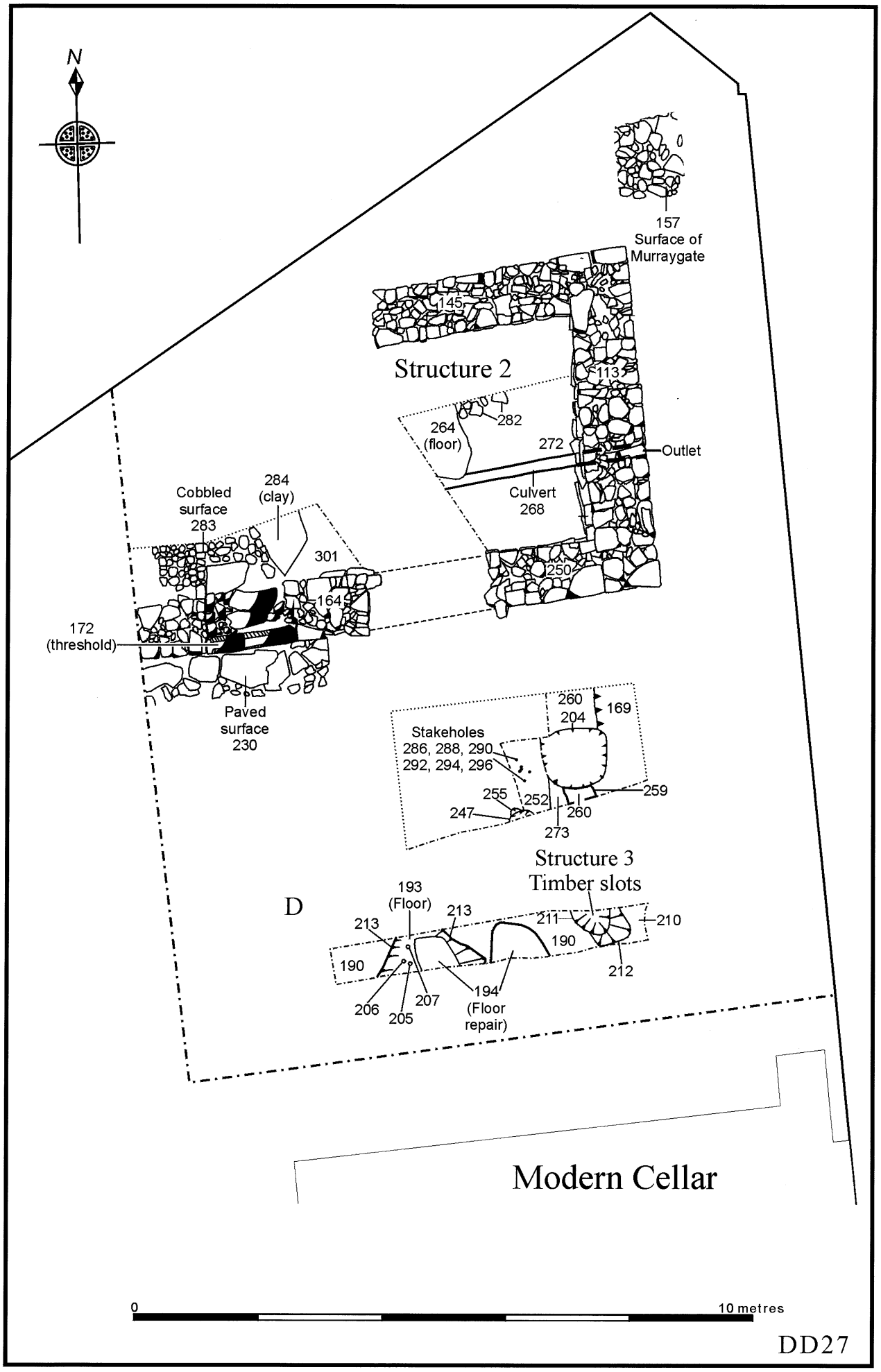
The stratigraphic sequence

Phase 1, 12th century (Illus 6)

Only plot 'C', to the south of the excavated area, produced evidence from this phase, notably a possible timber building (Structure 1). This plot had been bisected by trial trench D of the evaluation work (DD 26), and continued to the south beyond the excavation area.



Illus 6 *Phase 1 Structure 1 and various floor deposits.*



Illus 7 *Phase 2.*

Structure 1

To the south of trench D, above the natural (sand, gravel and sandy clay) was located the earliest floor level on the site, made up of two thin layers of clay loam with ash and organic inclusions, 217 and 218. It had been heavily truncated by later activity, notably pit cuts 219 and 220 to the south. To the south-east the natural was overlain by an organic deposit (182).

Lying over natural to the north of trench D was a shallow linear north–south cut (300) and vertical steep-sided cut 275. These apparently represented parts of an early wattle and daub construction (Structure 1). The lowest floor of this building was a dark grey clay layer with organic material (277), which had been covered by a make-up deposit (274/278; not illustrated) for a secondary floor layer (266), again a dark grey clay surface. If the floor deposits on either side of the trench derived from the same building, Structure 1 had a length north–—outh of at least 4m and a width of at least 3m.

Discussion

In plot 'C', to the south of the site, an early clay loam floor (217/218) was laid. This was cut by two pits: 219 and 220. Further north there were two cuts into natural: 275 and 300, which apparently represented parts of the earliest structure on the site, probably a wattle and daub building (Structure 1). This building had two floor layers, 277 and 266. These layers were likely to have been equivalent to 217 and 218 to the south. Although the surface of the Murraygate during this phase could not be investigated, due to waterlogging, it was obvious that habitation had already begun to cluster around this thoroughfare. The ceramic evidence from this phase suggests that it may date to the 12th century (see Hall below).

Phase 2, 12th–13th century (Illus 7)

Evidence of activity in this phase was located in Plots 'B' and 'C', and in the Murraygate.

Murraygate (Illus 8)

Running into the section to the east, sandstone cobbles were bonded with red-brown sandy clay to produce a rough paved surface (157) that ran roughly north–south. and apparently predated wall 115 to the west. This represented an early surface of the Murraygate, truncated by Trench DD 26 A to the south.

Structure 2

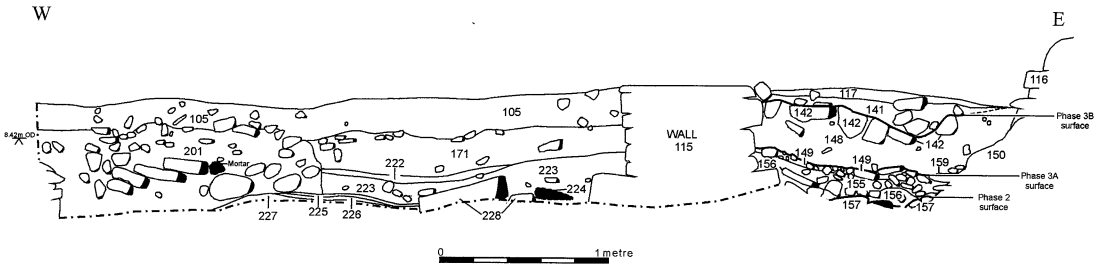
Plot 'B' was bisected by trench DD 26 B. To the east of the trench lay the frontage of the earliest building on this plot (Structure 2). This was north–south running wall 113, made of rough sandstone blocks (Illus 9 and 10). Around eight courses were visible, bonded with red-brown clay, and a possible drainage outlet was seen to the south, related to culvert 268. To the south the east–west return of this wall was referred to as 250, and to the north the return was 145. To the west of trench B, wall 250 continued as wall 164. The walls of this building were generally just under a metre wide. The doorway into the building (172) was clearly visible as part of 164 (Illus 11). It consisted of a chamfered threshold/step (Cox, see below [Find No. *47*]) in front of a roughly paved area. The earliest deposits in Structure 2 were layers of clay infilling (e.g. 272/301). Layer 272, to the east of DD 26 B, contained ceramics of the 12th or 13th century and was stratigraphically under possible partition 282, a linear structure of sandstone blocks running north–south through the building. 272 was also cut by 268, a shallow, narrow linear east–west running cut, with a length of around 2.5m. This ran from the opening in wall 113 and probably had a drainage function. Possible partition 282 was covered by a clay make-up layer, 281 (not illustrated), for the hard-packed clay floor of Structure 2 (264).

To the west of DD 26 B, a paved surface (230) lay to the south of doorway 172 between Structure 2 and the later Structure 5 (in Plot 'C'). This surface consisted of large, irregular stone slabs, one of which (0.8 x 0.6m) lay directly to the south of the doorway and may have been an entrance step. Inside Structure 2, abutting wall 164, was a spread of cobbles (283), perhaps an internal cobbled surface. To the east of 283 was a further layer of infill (284).

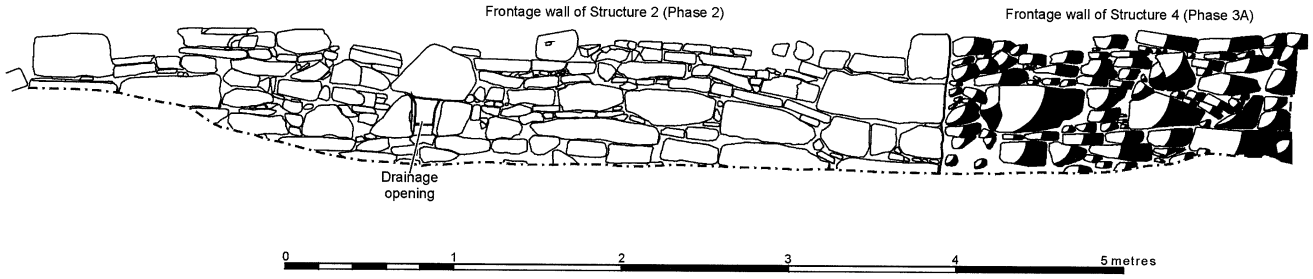
Structures 1 and 3

To the south of DD 26 D, an extensive levelling deposit (190/210), covered floor 217 of Structure 1. It was overlain by clay floor layer 193, which lay within a shallow cut feature, 213, that measured *c* 2m east–west, and may have been sub-rectangular in shape. The floor had been cut by three stakeholes, each with a diameter of *c* 0.06m (205, 206 and 207). These predated 194, patches of clay that repaired floor 193. To the south-east 190/210 had been cut by a U-shaped timber slot (212), which was truncated to the west by a later timber slot 211, a probable recutting of 212. These slots, and the three stakeholes probably represented the replacing of Structure 1 with the second timber building in this plot, Structure 3.

To the north, floor level 266 of Structure 1 was overlain by a make-up layer (252) equivalent to 190/210, with 12th to 13th-century pottery (Illus 18.3). This layer had been cut by a series of small stakeholes: 286, 288, 290, 292, 294 and 296, generally with diameters of less than 0.05m, all located within a metre square. Also cut into 252 was a shallow, roughly circular pit (255) with a diameter of 0.2m. Its fill (254) consisted of charcoal and mortar, and it was truncated by later sub-rectangular pit cut 247. 252 was overlain by several deposits, including silty clay levelling or make-up (273) for remnant floor surfaces (263 and 265, not illustrated).



Illus 8 *South-facing section through Murraygate surfaces and deposits in plot 'A'.*



Illus 9 *Early Murraygate frontage showing drainage opening.*

Illus 10 *View of drainage opening in west face of wall 113.*

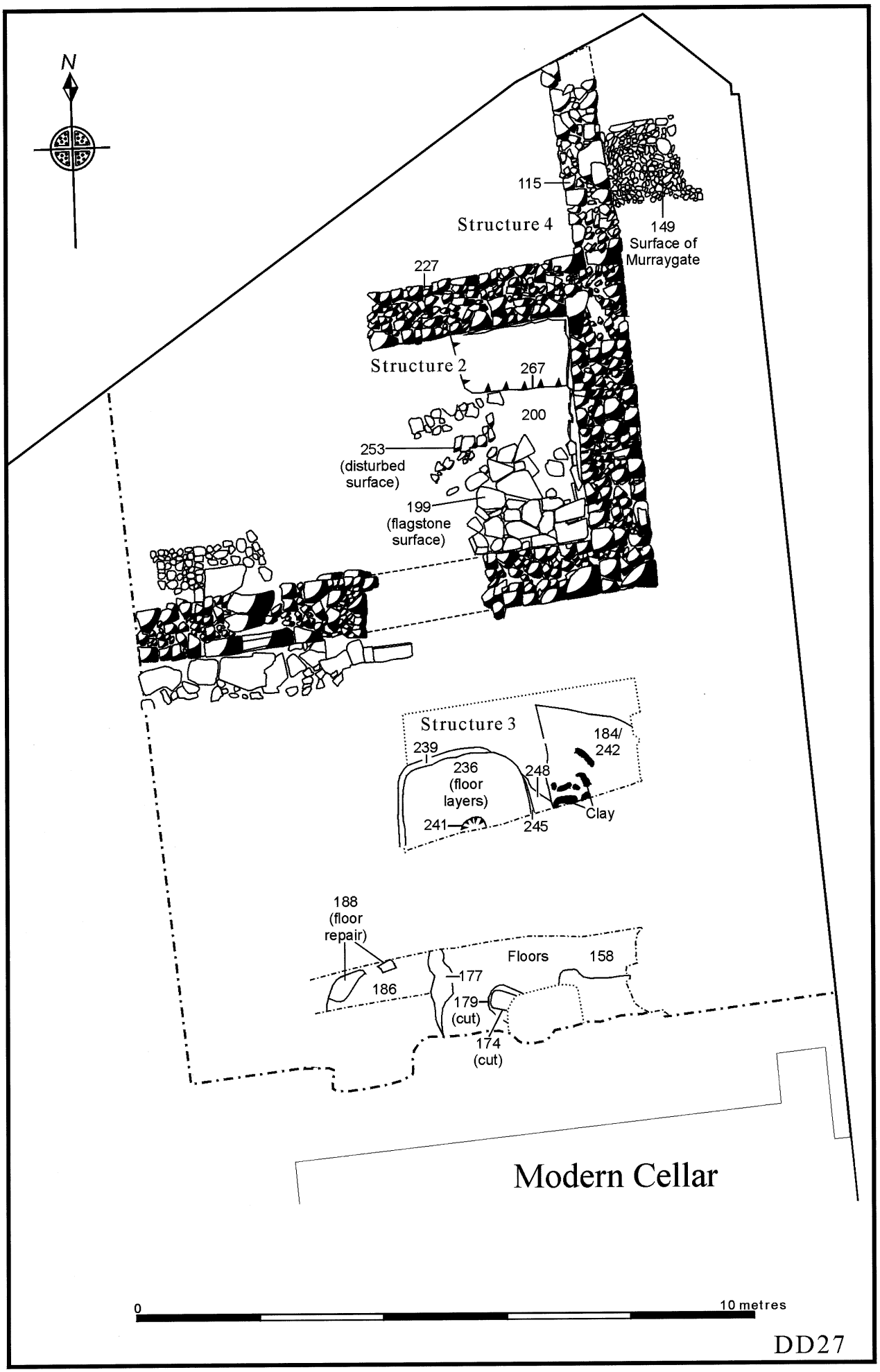
Illus 11 *Doorway 172 in Structure 2.*

Floor 263 lay underneath patches of mottled clay (260). This had been cut by a further pit (259) with a dark organic silt fill (169), which was cut by steep-sided pit 204. That contained a mixed organic ashy clay (249) with probable 12th to 13th-century ceramics (Illus 18.2; 18.8). These pits may have been part of Structure 3.

Discussion

During this phase the first visible surface of the Murraygate was laid (157). This abutted the east (frontage) wall of the first stone building on the site (Structure 2) which was located on plot 'B', directly to the north of plot 'C'. A probable drainage cut (268) ran north–south across the building, from an opening in frontage wall 113, an early sign of drainage problems on the site. Structure 2 had a hard-packed clay floor (264) during this phase, and also a possible cobbled surface (283). Its threshold (172) consisted of a reused sill [Find No. 47].

The site of timber Structure 1 in plot 'C' continued to be occupied, with a make-up or levelling deposit (190/210/252) cut by various small stakeholes—possibly part of a structure within the building. Over 190 floor 193 was cut by three further stakeholes, before being repaired (194). A timber slot (212) was cut into early infilling or levelling, probably recut by slot 211. These slots, and possibly the three latest stakeholes, apparently represented a later building (Structure 3)—probably the reconstruction of Structure 1. Post-dating floor 263 and the various stakeholes in the north of Structure 1 were several late pits, probably associated with Structure 3. Ceramic evidence from this phase suggests that it may date to the 12th to 13th century (see Hall below).



Illus 12 *Phase 3A.*

Illus 13 *Wall 115 of Structure 4 abutting wall 113 of Structure 2.*

Phase 3a, 13–14th century (Illus 12)

This phase saw the construction of a stone building (Structure 4) in plot 'A', and changes made to Structures 2 and 3, and the surface of the Murraygate.

Murraygate

Overlying the earlier surface 157 were two layers of material: midden deposit 156, lay under a make-up or foundation layer (155). This was the basis for a new surface of sandstone cobbles bonded with sandy clay (149). Pottery found in this cobbled street had a notably early date—probably the 12th or 13th century.

Structure 2

Structure 2 continued to be occupied, its interior being filled with various dumps of material including midden deposits, one of which (257: not illustrated) contained a ceramic fragment, possibly part of a decorative roof finial (Cox, see below [Find No. *12*]). These dumps lay below a deposit with a high organic content (200), which was found to contain carbonised wheat, barley, oat and rye grains. Yorkshire Ware (Illus 19.20) and East Coast Redware (Illus 18.13) ceramic material was located in context 200, pointing to a 13th- or 14th-century date. Of special interest was an iron axe head found in this context, identified as a carpentry tool of possibly 13th to 16th-century date (Cox, see below [Find No. *2*]). To the south-east of the building, 200 was covered by an irregular flagstone paved surface (199), which continued further north as a group of disturbed flat slabs (253). In the north-east corner of the building there was a pit (267) cut through the infilling, which measured *c* 2m E–W x 1.5m N–S. Its rubble fill, 181, contained roof tile (Cox, see below [Find No. *43*]).

Structure 3

To the north of trench DD 26 D, deposits 239 and 248 represented the build up of various floor layers in Structure 3 (in the case of 239 as many as 20 layers). These had been repaired by a small band of clay (245). Overlying 239 was a build-up of organic clay material (236), which had been cut to the south by a small pit (241). This pit lay under a mixed levelling dump 184/242, which contained organic material. Layer 242 contained several leather fragments including two offcuts (Cox, see below [Find No. *35a and b*]). Both contexts 236 and 239 were found to contain waterlogged seeds and fragmentary burnt bone.

South of trench DD 26 D was a sandy clay floor layer (158). This had been cut by a U-shaped gully or drain, 179, which was recut by 174. Further west, floor 158 was covered by a spread of orange-red clay (189, not illustrated). This represented either levelling, or the repair of floor 158. Floor 189 lay stratigraphically under the remnants of a later floor layer (177). This floor had been repaired with pink clay (186), and later with red/orange clay sand (188), before being covered by a sandy clay infill.

Ceramic evidence from this structure was varied. While a 13th- or 14th-century date was suggested by material from floor 158, that of the levelling material 242 had a 12th or 13th-century date. This latter material may well, however, have been residual.

Structure 4 (Illus 8)

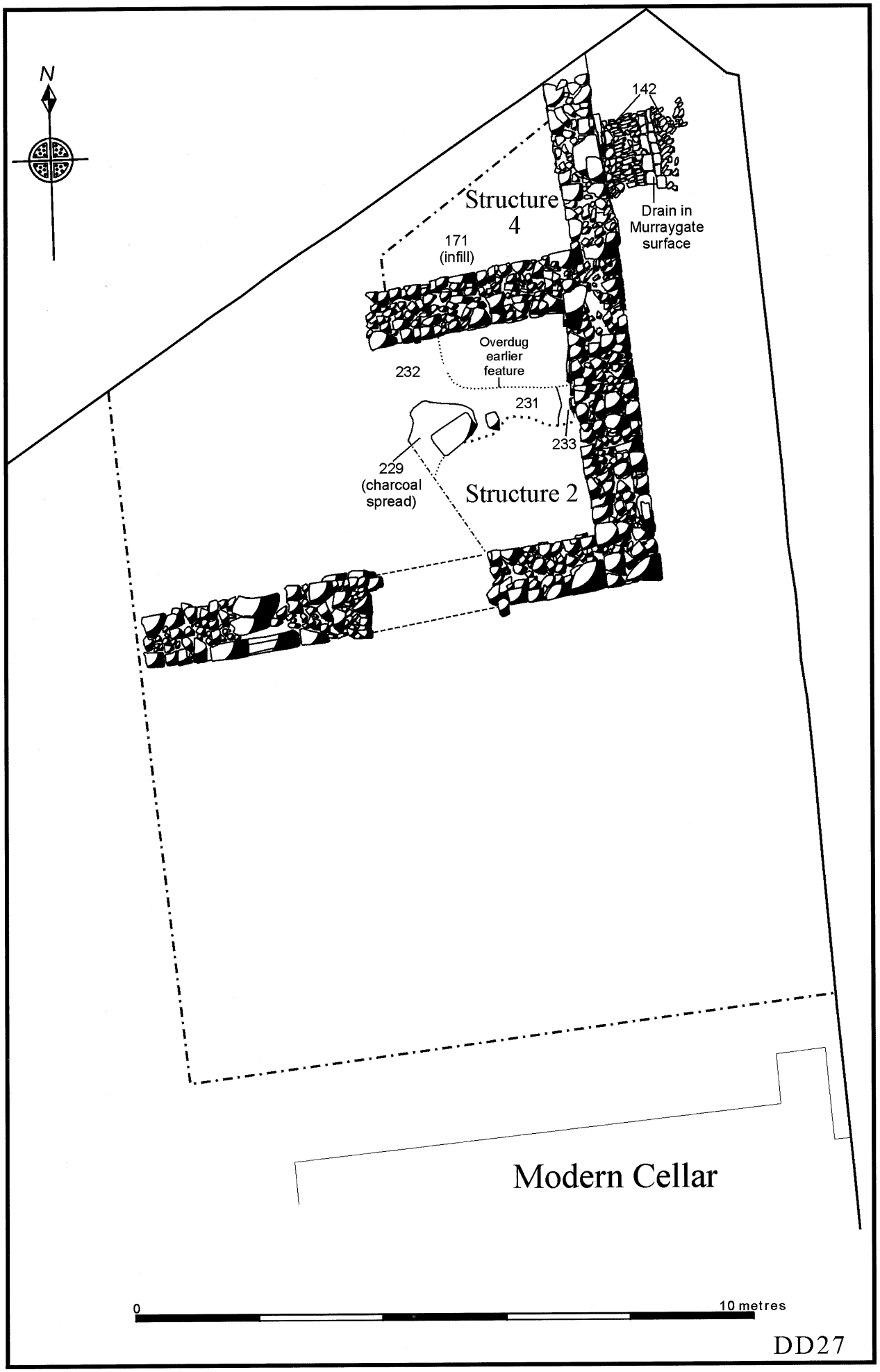
The earliest structure in the northernmost building plot (Plot 'A'), which continued to the north beyond the area of excavation, was the north–south sandstone wall frontage (115) of a building (Structure 4), which abutted the northern east–west wall (113) of Structure 2 (Illus 13). Wall 115 was visible for *c* 3m, running beyond the excavation limit. Its width was just 0.7m and it was laid when 157 was still the surface of the Murraygate. Structure 4 contained a layer of sandy silt clay infilling (227) under a clay-sand make-up layer 226, apparently the basis of possible clay floor 225. This 'floor' was covered by sandstone rubble (201/228), and other infilling deposits.

Discussion

Following the build-up of midden material over the first cobbled surface of the Murraygate it was replaced by a new cobbled road (155) along the same orientation. To the north of the site, in plot 'A', there then appeared a new building (Structure 4) with a Murraygate frontage formed by north–south running wall 115 abutting the east–west northern wall (113) of Structure 2. Late in this phase infilling deposits covered the floor (225) of Structure 4.

The earlier floor of Structure 2 was covered by various dumps of material, including midden and organic deposits, over which was laid a paved surface (199/253). One of the infilling deposits had been cut by a large pit (267) to the north-east of the building.

Many floor layers were built up in timber Structure 3 during this phase. This building was obviously in use for



Illus 14 *Phase 3B.*

a considerable length of time. There were various features cut into these floors, most notably a possible drain, 179, with a recut 174. At the end of this phase Structure 3 was covered by infilling and levelling deposits as it ceased to be occupied. Leather offcuts uncovered from the waterlogged infilling deposit 242 may be evidence of local industry, as may the axe head found in Structure 2.

Ceramic evidence pointed to a 13th to 14th-century date, notably the Yorkshire Ware and East Coast Redware in context 200. A fragment of a possible ceramic roof finial in midden context 257 of Structure 2 was one of several finds pointing to the existence of high status buildings in the area. Thirteen fragments of glazed ceramic roof tile were recovered from plots 'A' and 'B'—all bar one from phase 3 deposits. Excavations at Perth High Street have produced evidence that the buildings there may have been selectively tiled (Bogdan and di Falco, forthcoming). The recovery of twelve fragments of roof slates dating from phases 3a to 4b from contexts in all three plots at the Murraygate site also suggested the existence of buildings with higher quality roofing material.

Phase 3b, 13th–14th century (Illus 14)

The Murraygate was again renewed during this period. While Structure 2 remained in use Structure 4 continued to be infilled.

Murraygate

A layer of red-brown clay sand was laid over the existing cobbled surface as a foundation for a replacement surface (142). This surface was a more regular area of cobbling than earlier ones. Again sandstone blocks were used, bonded with sandy clay, and these were set in a herring-bone pattern, with a V-shaped drain formed with stone blocks visible to the east.

Structure 2

Over rubble dump 181 in Structure 2 was laid a clay construction or floor surface (231/232). To the west a spread of charcoal (229) lay above 232. Context 229, when sampled, was found to have been a spread of cleaned, but not fully processed, cereal grains—oat, wheat, barley and rye. To the east, against wall 113, there was a grey silty deposit, 233.

Structure 4

Overlying the earlier infill 222 in Structure 4 was a further 0.25m deep layer of clay and rubble infill, 171.

Discussion

Another cobbled surface (142), on this occasion with a regular herring-bone pattern and a stone-lined drain, was built over the previous Murraygate surface. A construction or floor surface was apparent in Structure 2, with various overlying deposits including a deposit of carbonised cleaned cereal grain which indicated the use of various cereal crops at this time (Hastie and Holden, see below). Further infilling occurred in Structure 4.

Phase 4a, 14th–15th century (Illus 15)

The only evidence of activity in this phase, dated to the 14th and 15th centuries, was located in plot 'C', where the first stone building in that area (Structure 5) was constructed.

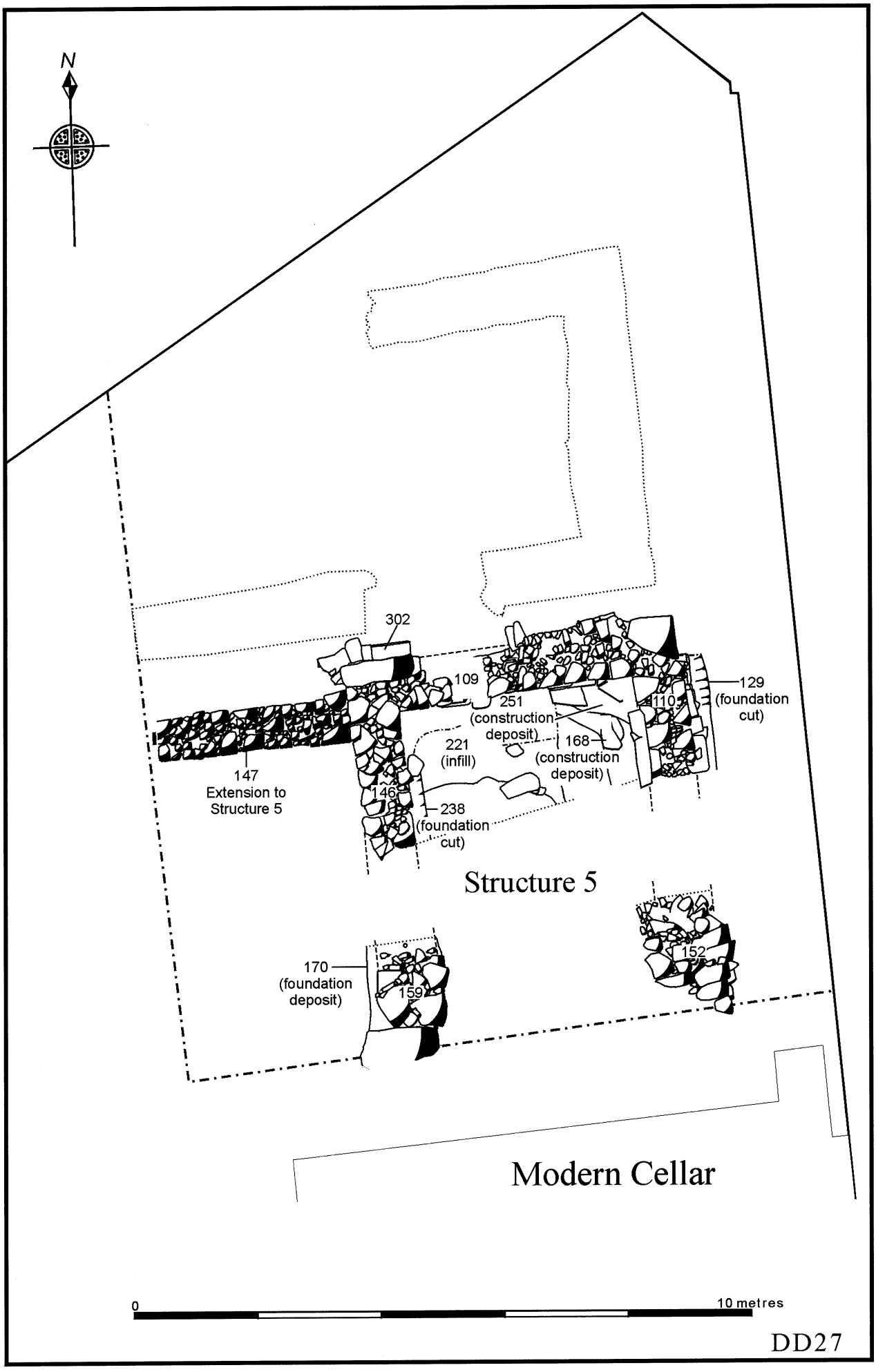
Structure 5

The north wall (109) of this building was uncovered in its entirety, but the southern ends of the east and west walls were not excavated due to the modern cellar to the south-east of the site, which also prevented the investigation of the south wall itself. The west wall was identified as 146 to the north and 159 to the south, while the east wall, fronting on the Murraygate, was 110 to the north and 152 to the south. The foundation cut for the walls of Structure 5 was visible in two locations. Cut 129, for wall 110, and cut 238, for wall 146, were excavated into levelling material 184/242.

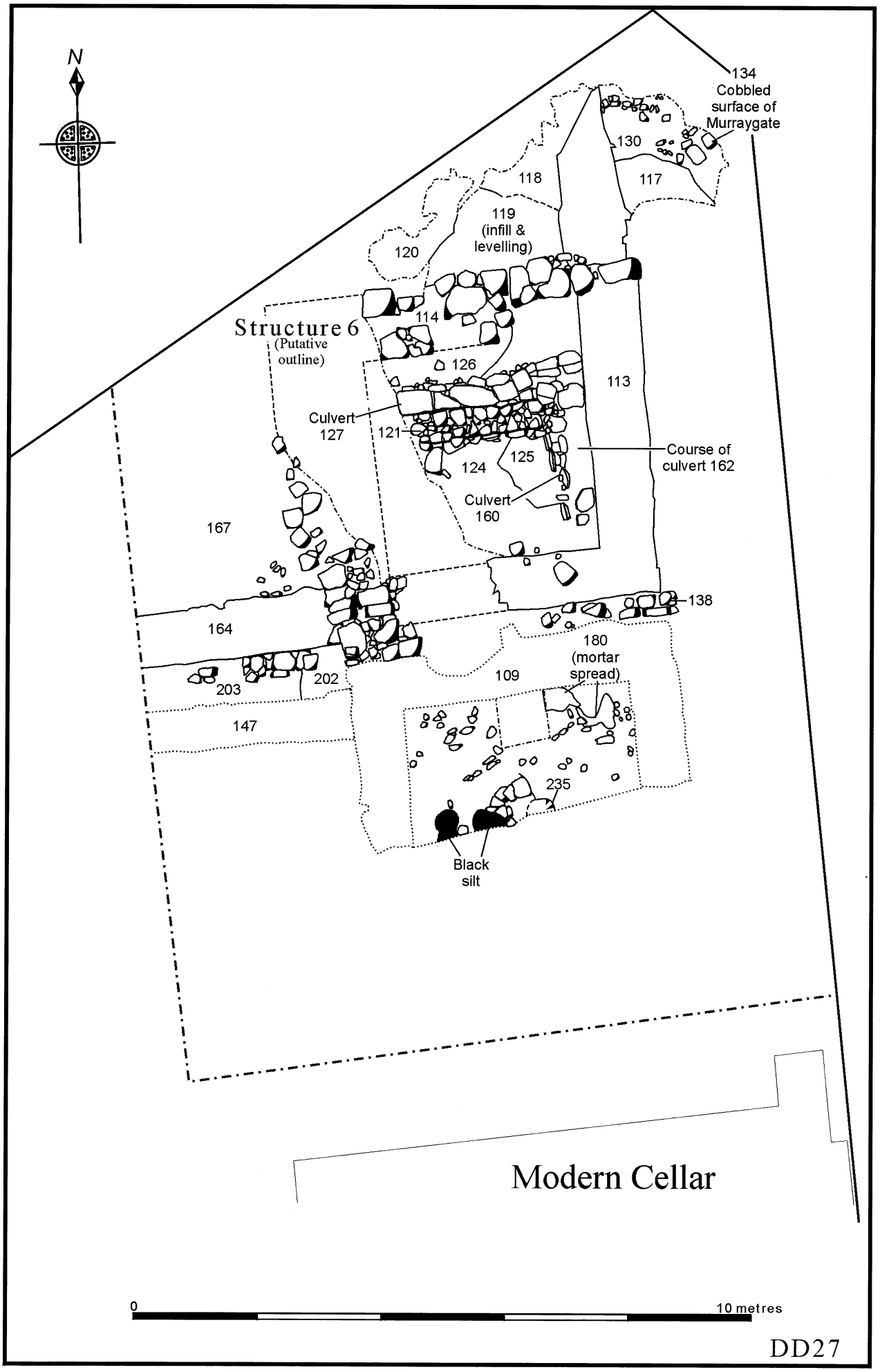
The frontage wall varied in form north and south of trench DD 26 D. To the south, wall 152 was *c* 1.65m wide, while to the north, wall 110 was only 0.87m wide. While both areas of wall consisted of sandstone blocks bonded with clay, the stones of wall 152 were generally larger than those of 110, and were not faced on their outer edges as those of the more regular 110 were. The lack of evidence of an east–west wall between these two sections suggested, however, that only one building existed in this plot, in spite of these variations. A similar disparity in scale was seen in the sections of the west wall. Wall 159 lay on top of 170, a silty clay foundation deposit. The north wall (109) of this building, again a construction of clay-bonded sandstone blocks, was faced with large slabs, and had a core of smaller fragments. Its width was around 1m, and it stood on a wide foundation of sandstone slabs.

Within the building lay 168, a sandy clay construction deposit, which contained Yorkshire Ware (Illus 19.19) and White Gritty Ware (Illus 18.6; 18.11), under a sandy clay infilling deposit, 221. Yellow-brown mortar 251, possibly another construction deposit, lay over foundation fill 128, against the corner formed by walls 109 and 110.

At some point after the construction of this building an east–west running extension (147) was constructed, abutting wall 146 to its west. This was again a sandstone wall bonded with clay. It was roughly faced and had a core of sandstone fragments of varying sizes. It survived to a height of four courses and added at least 3m to the length of Structure 5.



Illus 15 *Phase 4A.*



Illus 16 *Phase 4B.*

Discussion

During this period timber Structure 3 was replaced by a stone building (Structure 5), again fronting on the Murraygate. This had north–south walls that were markedly wider and more irregular to the south than to the north, suggesting, perhaps, that two separate stone buildings may have existed. Within the building were several probable construction deposits: 128, 168, 237 and 251, which lay under sandy clay infilling 221. Both Yorkshire Ware and White Gritty Ware were found in these deposits. A western extension to this building was constructed late in this phase: wall 147 abutted the east wall 146 to its north-west.

Phase 4b, 14th–15th century (Illus 16)

The Murraygate was again resurfaced. The insertion of culverts to a new stone building, Structure 6, pointed to drainage problems during this period.

Murraygate

Phase 3b Cobbled surface 142 was covered by a sandy clay infilling/levelling deposit, 141, which contained a stone disc (Cox, see below [Find No. *40*]), a possible gaming piece or vessel lid. This deposit lay under a make-up deposit (117) and a red-brown sand foundation layer (130), which were the basis for a final surface of sandstone cobbles (134).

Structure 5

The earlier infilling, 221, of Structure 5 was cut by a small rounded pit, 235. Following the backfilling of this pit, the building had been infilled with various deposits such as 180—a mortar-rich context—which may have represented construction debris.

Structure 6

The earlier infilling (171) within Structure 4 was overlain by further infilling or make-up material (105) that lay directly stratigraphically under an east–west running sandstone wall (114). This wall survived as a single course of mortar-bonded sandstone blocks. It is not known whether it represented a rebuilding of wall 145 of Structure 2, which it imperfectly overlay, or the foundations of a later structure (Structure 6). The latter interpretation is preferred. Such a structure, with 114 as its north wall and north–south running wall 163 as a partition (or west wall), would have reused frontage wall 113 and south wall 250 (and possibly 164). Wall 163, a construction of sandstone blocks bonded with clay, stood over a mixed infilling or levelling deposit equivalent to 105 to the north. To the south this wall apparently lay over east–west wall 164 of Structure 2, and abutted the corner formed by walls 146 and 109 of Structure 5. It probably represented the foundations of a wall of similar date to wall 114. 163 lay under infilling or levelling within Structure 6 such as 167.

Further clay levelling deposits, apparently equivalent to infilling such as 167, lay to the south of wall 114 and north of later wall 121. These included 126, redeposited midden material, which contained a possible fragment of a key for a barrel lock (Cox, see below [Find No. *3*]). There were equivalent infilling deposits, such as 124 and 125, to the south of plot 'B'. These were probably of the same date as infilling118, 119 and 120 to the north of wall 114.

Wall 121 was an east–west running clay-bonded sandstone wall located inside Structure 6. It was built over infilling deposit 126, and lay to the south of wall 145. Various drainage features were inserted into Structure 6 after wall 121 was built. A stone box culvert (162) ran north–south parallel to wall 113. It apparently continued through wall 121 and connected with east–west running box culvert 127, which lay directly to the north of and against wall 121. A further, possibly later, linear stone culvert (160) ran north–south directly to the west of culvert 162. Approximately 1.5m of this feature survived, running south from wall 121. The fill of this culvert (161) was the same as the underlying deposit, suggesting that it had been backfilled when the feature went out of use. Overlying culvert 127 to the north-east was a rubble and clay infilling/levelling deposit (122; not illustrated).

Gap between Structures 5 and 6

In the narrow space between wall 164/250 of Structure 6 and walls 109 and 147 of Structure 5 there were various intentional blocking deposits. The earliest of these, 138, consisting of sandstone slabs, was overlain by deposits of rubble mixed with clay and midden material such as 202/203. This blocking/infilling activity predated the construction of foundation wall 163 of Structure 6.

Discussion

The latest medieval cobbled surface of the Murraygate (134) was laid. Further infilling or levelling was laid over Structure 4 and in Structure 2, which predated east–west wall 114 and north–south wall 163, probably the foundations for a new stone building (Structure 6).

Structure 6 also reused frontage 113 and wall 250 (and possibly 164). Post-dating the insertion of wall 163 was much infilling and levelling activity. An east–west running stone wall (121) to the south of wall 114, was probably an internal wall of Structure 6. Overlying the infilling and levelling within the building various stone culverts were built, suggesting that drainage had become a major problem (127/162 and 160). Culvert 127 of Structure 6 was overlain by further infilling/levelling, as was the area to the north of the structure.

A pit (235) was dug into the earlier infilling (221) of Structure 5, only to be backfilled and covered with further infilling material. Thus all structures were

covered by infilling at the end of this phase as they went out of use.

Although some early (12th to 13th-century) ceramic material was located, e.g. in deposit 202, most ceramic evidence, including East Coast Redware found in contexts 137 and 163 (Illus 18.12; 19.17; 19.18), pointed to a 14th to 15th-century date for this phase. Infilling deposit 105 contained probably intrusive later finds: two biconical clay pipe bowls, dated to between *c* 1640 and 1665, and a Dutch pipe bowl dated to *c* 1660–1680 (Gallagher, see below).

Phase 5, 19th–20th century (Illus 17)

Evidence from this phase was markedly later in date than the medieval remains uncovered in the previous periods, probably due to the removal of deposits during the insertion of 19th-century buildings. There was no further evidence of the Murraygate itself until the present surface, because later frontages encroached further to the east beyond the area of excavation.

Structure 7

There was a layer of demolition or make-up material (104; not illustrated) over infilling 118/120 to the north, and also cobbled surface 134 of the Murraygate. Over this layer, and above earlier wall 145, were the remains of north–south running mortar-bonded sandstone wall foundations, 133. This was covered by midden material 103 to a depth of 0.3m. Towards the eastern edge of the excavation was an area of clay-bonded sandstone blocks, 151—the foundation for north–south running wall 116, which was visible surviving to a height of 0.5m as four courses of sandstone blocks with clay and mortar bonding. 116 ran under the present paved surface of the Murraygate, beyond the limit of excavation to the east. The return of 116 to the north, running from east to west, was mortar-bonded sandstone wall 102, which had been badly damaged by machining. These walls (102, 116 and 133) were apparently the foundations for a now-demolished 19th-century building (Structure 7). The infilling (166) of Structure 6 was overlain by modern clay deposit 165, to the west of DD 26 B. Over 165 was built a brick cellar (185), which may have pertained to Structure 7.

Structure 8

To the north of trench DD 26 D Phase 4 mortar deposit 251 lay under infill/levelling deposits such as 131 and 143 (not illustrated). Over these was a make-up deposit for north–south wall 112. This was a clay-bonded sandstone wall that fronted on the present Murraygate, and stood further east than the earlier frontages. To the north it returned east to west as wall 111, which abutted the corner formed by walls 109 and 110. Walls 111 and 112 were apparently all that remained of Structure 8, which overlay the walls of Structure 5. Against the north of 111 was an area of sandstone slabs (140), part of a paved surface. Overlying the infilling within Structure 5 was a sandy silt levelling deposit, 108. Set directly over this, to the south of wall 109, was a large concrete block (107), part of recent building foundations perhaps associated with Structure 8. Dumped around this block was a deposit of grey clay infilling or levelling. Further west, to the south of wall 147, lay the infill (197) of the western 'extension' to Structure 5.

South of DD 26 D the phase 4a walls 152 and 159 lay underneath recent demolition debris (153). This had been cut by an engineer's test pit (214). The site was covered by a mixed deposit of demolition debris, 101(not illustrated).

Discussion

This phase dated to the 19th and 20th centuries. To the north 104 may have represented an episode of demolition. Over this, and wall 145, a mortar-bonded sandstone wall (133) ran north–south beyond the northern section of the site, the foundations of a 19th-century building (Structure 7). The northern and eastern foundations for this structure were probably walls 102 and 116. Its brick cellar (185) was built over infilling deposits of Structure 6.

To the south the Murraygate frontage wall 112 of a late building (Structure 8) was constructed. The north wall (111) of this building abutted the corner of earlier walls 109 and 110, suggesting that Structure 8 was basically built on the remains of Structure 5. Both frontage walls 112 and 116 were markedly further east than earlier frontages such as 110, suggesting that the width of the Murraygate had been narrowed in the 19th century. A large concrete block (107) placed over levelling and infilling deposits in Structure 5 represented recent building foundations (probably related to Structure 8). This was surrounded by further infilling and demolition debris.

The pottery

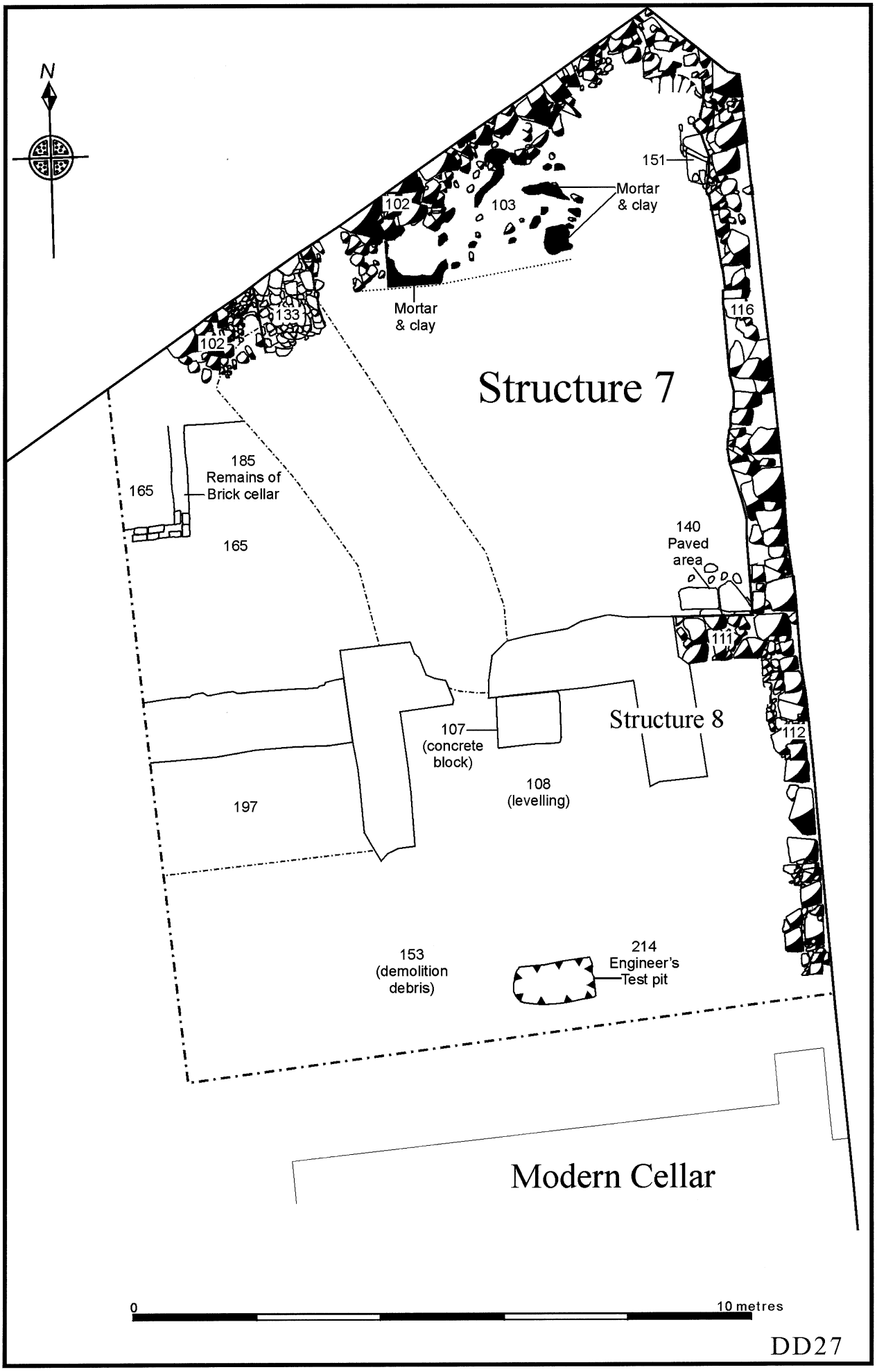
Derek W Hall

Introduction

This excavation produced a moderate assemblage of pottery, 591 sherds. All of this material apart from six sherds was of medieval date. All the sherds have been examined by eye and, where possible, assigned to a recognised fabric name. No petrological analysis has been undertaken.

White gritty ware

Recent work has identified three potential production centres for this fabric in Lothian, Borders and Fife regions (Haggarty *et al.* 1984; Hall 1997). It has been found in Perth in association with 12th-century fabrics and appears to predate the Redware industry and may



Illus 17 *Phase 5, 19th–20th-century features.*

have ceased production by the 15th century. It is most commonly highly fired to a white or grey colour and contains quartz inclusions.

This assemblage is dominated by this fabric (74%) and cooking pots are the most common vessel form. The forms from this site include an unusual collared rim (Cat 2) and a rod handled form (Cat 1) which may be a copy of a metal vessel that is common in the Low Countries (Alan Vince pers comm).

East coast redware

Fifteen years of archaeological excavations in the Scottish east coast burghs have identified this fabric type as forming a tradition of native pottery production apparently dating from the 13th to the 15th centuries (Hall 1996, 126). Recent chemical analysis by the British Geological Survey has suggested that Redware fabrics found in the burghs of Perth and Dundee are from different clay sources. The location of the production centres for these fabrics is unknown at the time of writing. Vessel forms from this site are from both jugs and cooking pots.

Yorkshire ware

Vessels in these distinctively glazed fabrics are the most common imports in the east coast burghs in the 13th and 14th centuries (McCarthy and Brooks 1988, 227–52). There are 12 sherds in this assemblage which are all from glazed jugs.

Low Countries greyware

From excavations in Perth it is now becoming clear that vessels in this fabric were amongst the most popular of the imported wares in 12th-century Scotland (Hall forthcoming). It has been argued that early groups of this fabric were scarce and did not really start appearing in quantity until the 13th century (Verhaeghe 1983). There is only one sherd from this site from Phase 4b which is probably residual in context.

Low Countries redware

This fabric begins to replace the earlier Low Countries greywares from the mid-14th century onwards (Verhaege 1983, 25). There are three sherds in this assemblage, all from Phase 4.

Raeren stoneware

The four sherds in this assemblage are from vessels produced at Raeren in Belgium. This fabric was a very common import into Britain in the 15th and 16th centuries (Hurst et al 1986, 194). Vessels in this fabric are distinctively glazed a glossy brown colour on their external surfaces.

Discussion

This small group of ceramic is probably the best stratified assemblage to have been recovered from the medieval burgh. Although there is a sizeable assemblage from the 1960s development work at the Overgate, it is all unstratified. The fact that the local redwares do not appear on site until Phase 3a appears to confirm previous suggestions that this industry did not start until the 13th century, particularly as Phases 1 and 2 are only producing sherds of white gritty ware which is known to have been produced in the 12th century (Hall 1996, 127).

Table 1 *Pottery*

Fabric glossary

WG	Scottish white gritty ware
ECR	East coast redware
Yo	Yorkshire ware
LCR	Low Countries redware
LCG	Low Countries greyware
Sto	Rhenish stoneware
Mod	Early modern ceramics
Unid	unidentified fabrics

Phase	WG	ECR	Yo	LCR	LCG	Sto	Mod	Unid
1	5	0	0	0	0	0	0	0
2	34	0	0	0	0	0	0	0
3a	146	22	6	0	0	0	0	1
3b	36	15	0	0	0	0	0	0
4a	22	16	3	1	0	0	0	0
4b	185	59	3	2	1	2	0	3
5	9	12	0	0	0	2	6	0
	437	124	12	3	1	4	6	4

total 591 sherds

Pottery illustration catalogue (Illus 19 and 20)

White gritty ware

1 Rim, sidewalls and complete rod handle from cooking pot with patches of green splashed glaze contexts 198 and 227 Phase 3a/4b.

2 Collared rimsherd from cooking pot 249 phase 2.

3 Rimsherds from cooking pot with traces of external smoke blackening context 252 phase 2.

4 Rimsherd from cooking pot with traces of external smoke blackening context 186 phase 3a.

5 Rimsherd from cooking pot context 248 phase 3a.

6 Rimsherd from cooking pot with traces of external smoke blackening context 168 phase 4a.

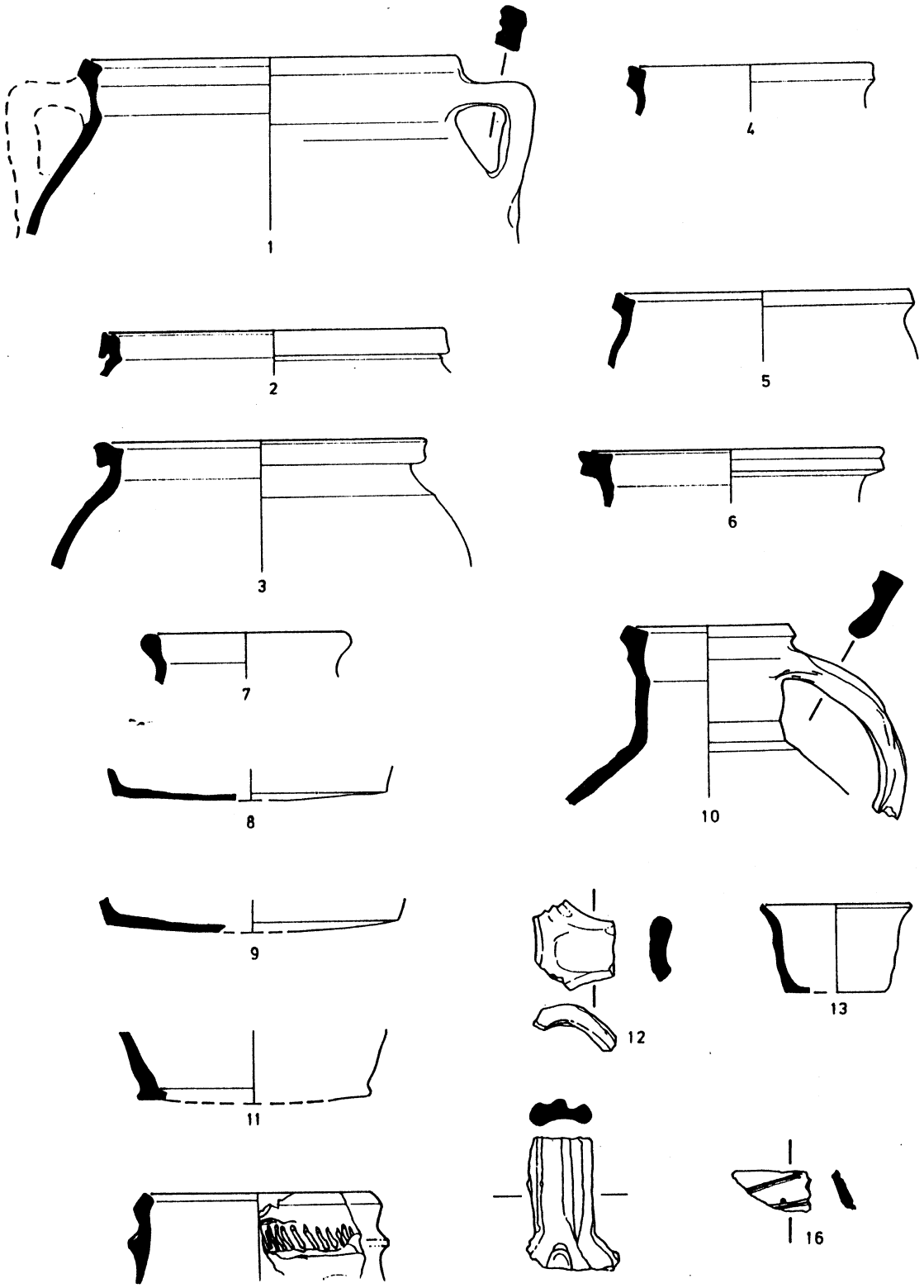
7 Rimsherd from cooking pot context 154 phase 4b.

8 Basesherd from cooking pot with traces of external smoke blackening context 249 phase 2.

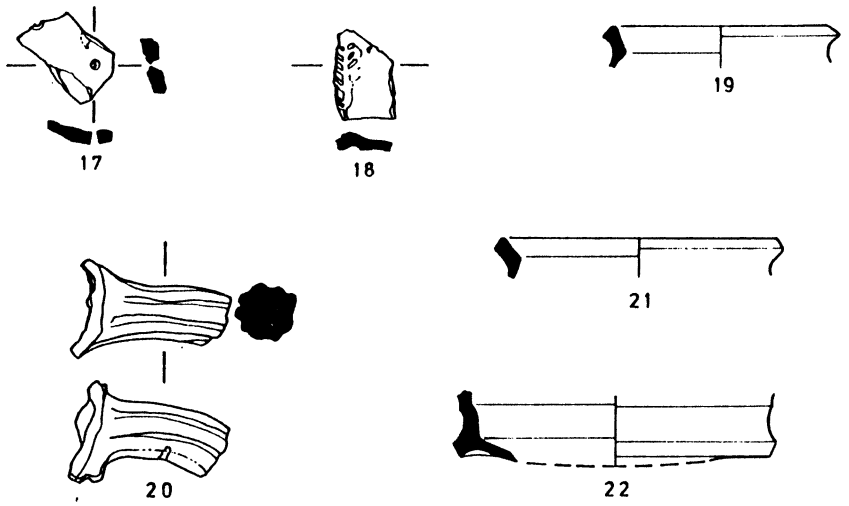
9 Basesherd from cooking pot with external smoke blackening context 280 phase 2

10 Rim, neck and strap handle from jug with splashes of green glaze context 158 phase 3a.

11 Basesherd from unglazed jug context 168 phase 4a.



Illus 18 *1–11 Scottish White Gritty ware, 12–16 East Coast Redware. Scale 1:4.*



Illus 19 *17–18 East Coast Redware, 19–20 Yorkshire ware, 21–2 unidentified. Scale 1:4.*

East coast redware

12 Rimsherd with strap handle junction from jug context 163 phase 3a.

13 Rim to base profile from small vessel internally glazed green context 200 phase 3a

14 Rimsherd from jug with handle junction decorated with incised lines unstratified.

15 Ribbed strap handle from jug with patches of external green glaze context 197 phase 5.

16 Bodysherd from jug decorated with incised lines and traces of external green glaze context 170 phase 4a.

17 Bodysherd from unidentified vessel form with two holes drilled through it context 137 phase 4b.

18 Bodysherd from green glazed jug decorated with embossed leaf context 163 phase 4b.

Yorkshire ware

19 Rimsherd from jar glazed lustrous green context 168 phase 4a.

20 Ribbed rod handle from jug glazed lustrous green context 200 phase 3a.

Unidentified

21 Rimsherd from jug in red gritty fabric slipped white internally and externally context 127 phase 4b.

22 Slightly thumbed basesherd from jug with patches of external green glaze context 257200 phase 3a.

The artefacts (Illus 20 and 21)

Adrian Cox
with a contribution on the clay pipes by Dennis Gallagher

Introduction

The artefact assemblage from this excavation includes an unusually diverse range of material and object types from a medieval site in Dundee, and represents rare and important evidence of medieval activities and material culture within the burgh. The survival of waterlogged, organic remains adds to the importance of this assemblage since this category of material has, until now, been largely missing from the archaeological record in Dundee. This assemblage adds to the information about medieval material culture and everyday life recovered from the recent excavation at 106–110 Nethergate (Mackenzie 1998) and has good potential for interpretive display.

Of particular significance within this assemblage are the iron artefacts, some of which relate well to the recovered structural remains. The well-preserved axe head is a rare find in a Scottish context. Small groups of glazed ceramic roof tile fragments and stone roof slates also add to our understanding of the buildings found on the site. These and the other components of the assemblage are described and discussed below by material type. A select catalogue is presented, and measurements are expressed to the nearest 1 mm.

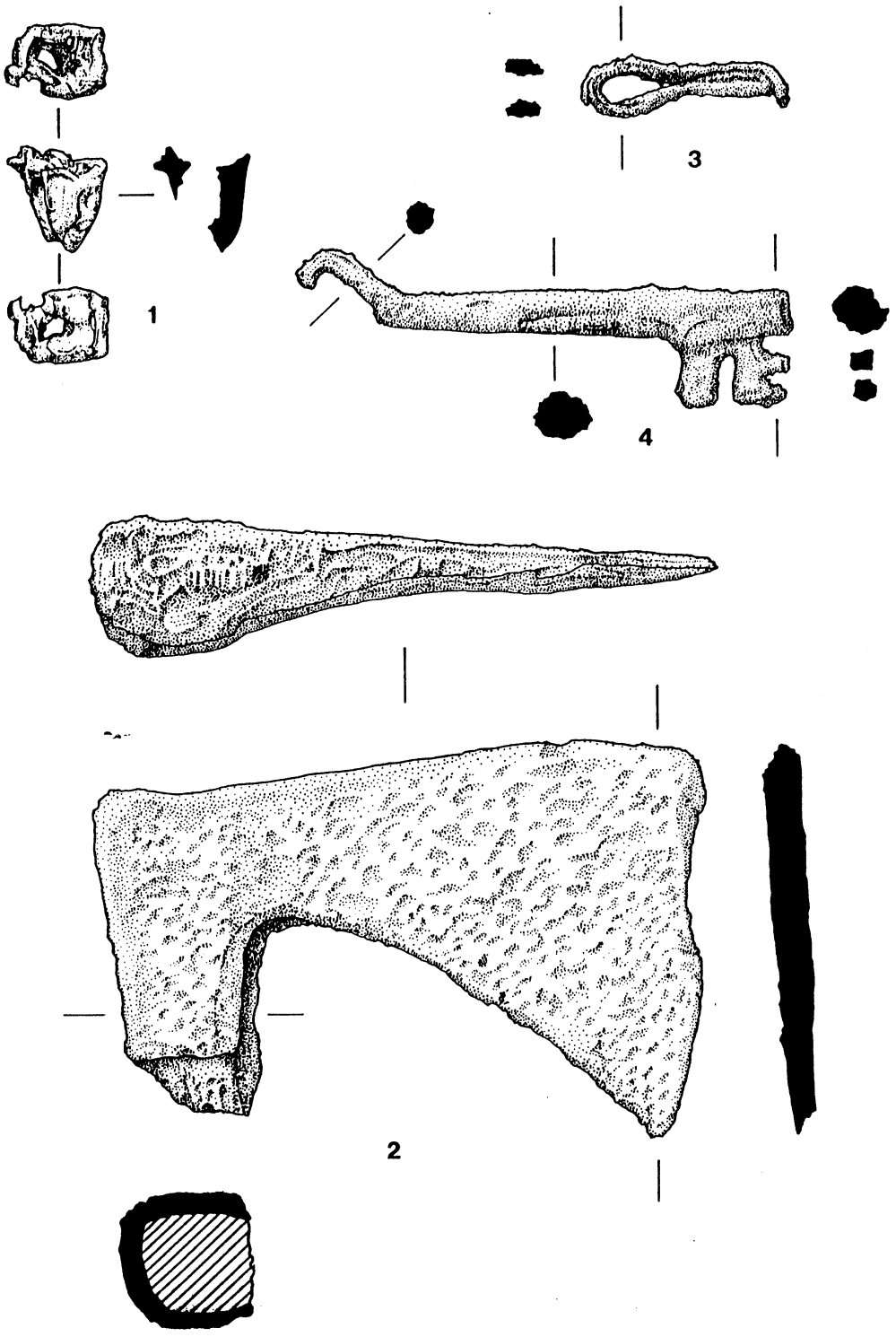
Lead alloy objects

An irregularly shaped object recovered from a levelling deposit in Plot B (Catalogue No 1) represents caulking, which would have been used to secure an iron masonry cramp or hinge pivot into a rebate in stonework. The use of lead caulking in this way helped to prevent the iron from rusting and splitting the stone into which it was inserted. Although no hinge pivot was found, part of an iron strap hinge (No 8, below) was recovered from the same deposit, and it is possible that these two artefacts derived from the same structural context.

1 Caulking Length 25 mm; max width 29 mm; thickness 21 mm
Object representing caulking, with a rectangular cross-sectioned perforation through its centre. The piece has two roughly right-angled edges although the others are irregular. Context 167; Find No 5; Phase 4b

Iron objects

The varied assemblage of iron artefacts reflects the diversity of evidence recovered from this excavation.



Illus 20 *1 Lead alloy object. 2–4 Iron objects. Scale 1:2.*

Among the functional categories represented are tools, structural fittings, horse equipment and keys.

The head of an axe, with a remnant of its wooden shaft surviving in the socket (No 2), was found in an organic deposit underlying the stone flagged floor in the south-eastern corner of the building in Plot B.

It is a basically triangular axe with a broad cutting edge and a square cross-sectioned socket, and represents a form of carpentry axe, corresponding to Type II in the London Museum *Medieval catalogue* (London Museum 1940, 55). Axes of this form are commonly depicted in pictorial representations of carpentry dating from the 13th to the 16th centuries. These include an illustration in the mid 13th-century Maciejowski Bible (ff 2b and 3b) and an early 16th-century fresco from Carpenter's Hall, London (*ibid*, 59). In terms of modern axe forms, probably the closest parallel is the Kent felling axe (also known as a trimming axe), used to fell and lop trees. As Jackson and Day (1978, 320) note, a much greater variety of axe forms existed in the medieval period, as different tradesmen developed their own patterns, each type of axe having regional variations according to the kind of work done and the wood locally available. Over the last two centuries, the number of specialised and regional variants has declined.

2 Axe Length 186 mm; width of cutting edge 113 mm; thickness 36 mm
Axe head of roughly triangular form, with a straight front edge and a concave rear edge. It has a broad cutting edge, the central part of which is slightly damaged. The socket into which the wooden shaft was inserted has a roughly square cross-section, with a V-shaped recess in its underside. A remnant of the shaft itself survives within the socket.
Context 200; Find No 36; Phase 3a

No 3 is a single, figure-of-8 shaped link from a chain. It was found in a deposit containing redeposited midden material, in Plot B. This example has broken at one end, and the corresponding loop has become distorted, however X-radiography reveals that a small space remains between the two sides of the loop. Chains were used to suspend a variety of objects, and were often secured by eye bolts or U-shaped staples like No 7. A smaller figure-of-8 chain link was found at Meal Vennel, Perth, where an eye bolt with part of a link attached was also recovered (Cox 1996, 775).

3 Chain link Length 60 mm; width 15 mm; thickness 7 mm
Probable chain link, originally of figure-of-8 form, made from a rectangular cross-sectioned strip. One end of the object has broken and the corresponding loop has become distorted.
Context 257; Find No 26; Phase 3a

A large door key (No 4) was found in a clay levelling deposit in Plot B. It has a large, roughly square bit and the bow appears to have originally been lozenge-shaped. Lozenge-shaped bows appear commonly on keys of 13th- and 14th-century date. Contemporary representations of the form appear, for example, on the 13th-century coinage of Avignon (London Museum 1940, 139). A copper alloy key with this type of bow was found recently near St Monans in Fife (Cox and King 1997, 199, Illus 5, No 23).

4 Key Length 145 mm; original width of bow *c* 38–40 mm; depth of bit (below shaft) 22 mm
Key with a solid, circular cross-sectioned shaft, increasing in diameter towards the bit, and an incomplete, centrally-set bow. The roughly square bit has three ward cuts; two horizontal and one vertical.
Context 198; Find No 23; Phase 4b

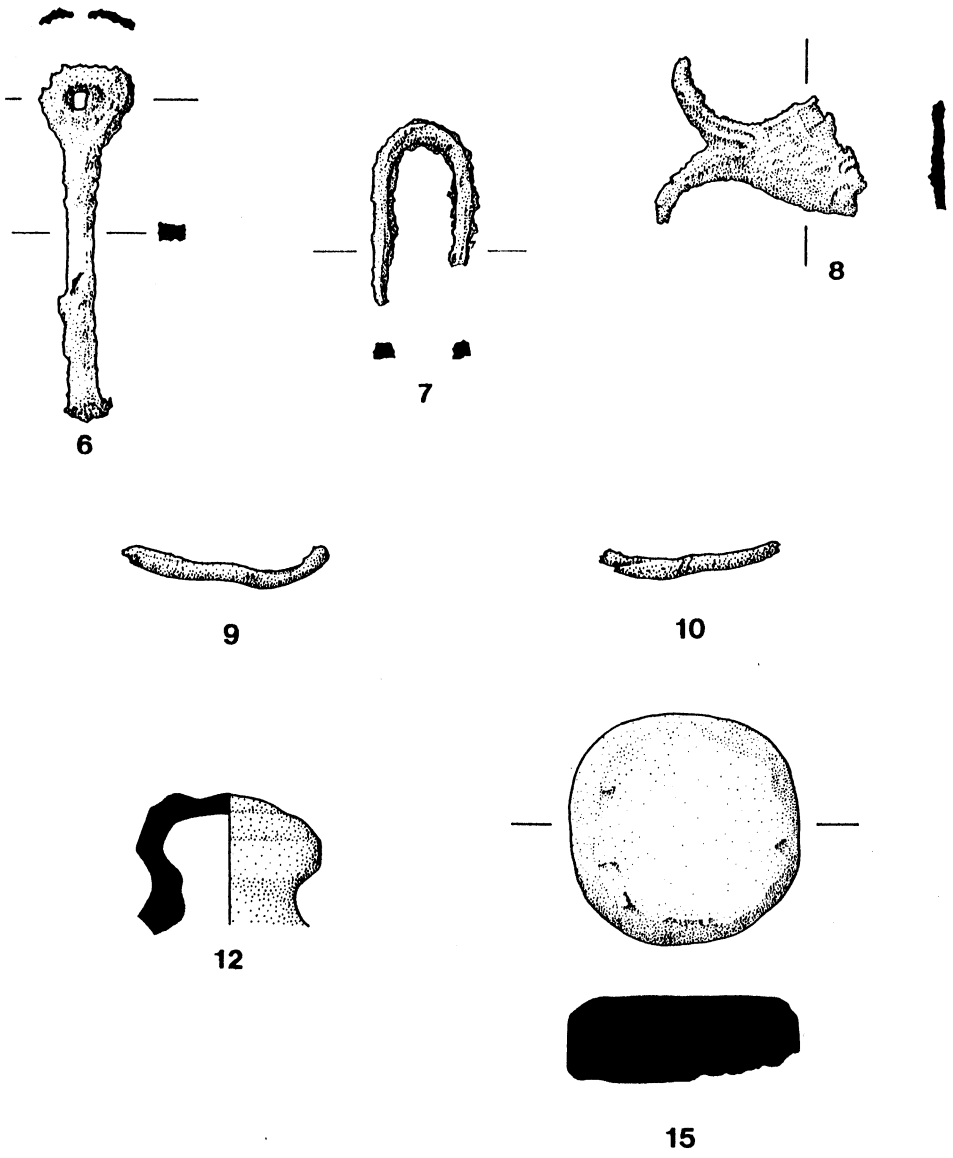
Several nail fragments were recovered from a range of contexts, the most predominant type having a circular head and a rectangular cross-sectioned shaft. A single horseshoe nail (No 5) was also found, in a deposit of sandstone boulders in Plot A. This 'fiddle-key' type of horseshoe nail is generally thought to have been used from as early as the 9th century until around the middle of the 13th century (Clark 1986, 2), although the dating of three examples from Perth, based on associated pottery, indicates that the type was still in use in the 14th century (Ford and Walsh 1987, 137). No 5 is very heavily corroded, hence identification and measurement have been assisted by X-radiography.

5 Horseshoe nail Length 28 mm; width across head 11 mm
Horseshoe nail of 'fiddle-key' form, missing the tip of the shaft. Heavily corroded. (Not illustrated)
Context 201; Find No 31; Phase 3a

From a levelling deposit in Plot B, No 6 may represent part of a key used to open a barrel padlock. Medieval barrel padlocks were opened using keys which were drawn or pushed along the springs of the lock's internal mechanism, depressing them and thus opening the lock. Both locks and keys may have been manufactured locally within the burghs in the medieval period. Examples have been found in Perth, Aberdeen and Rattray (Ford 1987, 133–4; Cox 1996, 777–9; Goodall 1982, 188 and 1993, 179–82), and Ewan (1990, 34) notes the existence of a record of a Robert 'lokessmyth' in a record of 1214, suggesting the existence of the craft from at least the 13th century. A padlock key from a 13th–14th century phase at Kirk Close, Perth (Ford 1987, 133, Illus 66, No 86), has a very similar form of suspension loop to that surviving on No 6.

6 Padlock key? Length 92 mm; max width 24 mm; thickness 4 mm
Possible padlock key fragment representing the shaft, which terminates in a broad, lobate suspension loop. The bit is missing.
Context 126; Find No 3; Phase 4b

U-shaped staples like No 7 were used in structural woodwork, and could also be used in conjunction with a hasp to fasten doors and gates and secure the lids of



Illus 21 *6–10 Iron objects. 9–10 Leather. 12 Ceramic finial fragment. 15 Stone object. Scale 1:2.*

chests. Examples have been recovered from several other Scottish medieval sites, for example Lochmaben Castle (MacDonald and Laing 1975, 148), Castle Sween (Ewart and Triscott 1996, 539, Illus 14, No 35) and Rattray (Goodall 1993, 179, Fig 34, Nos 51–6). No 7 was recovered from redeposited midden material in Phase 4b.

7 Staple Length 48 mm; width 26 mm; thickness 6 mm
U-shaped staple with rectangular cross-sectioned arms, one of which is complete, terminating in a point.
Context 202; Find No 21; Phase 4b

Found in an infill or levelling deposit in Phase 4b, No 8 is part of a strap hinge with an elaborate, bifurcated terminal. It is possibly from a shutter, although small strap hinges were also used on chests and armoires. The hinge would have been secured to the wood by a line of rivets along its central axis. X-radiography of the artefact reveals the possible presence of a roughly rectangular rivet hole, approximately 2-3 mm in width, lying 13 mm away from the point of bifurcation. The iron sheet from which the hinge is made is very thin, particularly where it has fractured. Possibly the object was discarded as a result of wear and corrosion. A more complete strap hinge with a similar terminal, was found in an unstratified context at Goltho (Goodall 1975, 86, Fig 40, No 75).

8 Strap hinge Length 53 mm; width at terminal 43 mm; thickness 2 mm
Fragment of a strap hinge, incorporating a bifurcated terminal.
Context 167; Find No 9; Phase 4b

A small group of leather offcuts and scraps was found in a levelling deposit in Plot C (Phase 3a). The two offcuts (Nos 9 and 10) are in the form of narrow, tapering strips, while two of the four accompanying scraps each have a single cut edge. The remaining edges of the scraps are torn and all of the leather is in a

delaminated condition. The assemblage was recovered in a waterlogged state and has been conserved by freeze-drying, the measurements below recorded after conservation.

9 Offcut Length 52 mm; width 5 mm; thickness 1 mm
Offcut strip with cut edges, tapering slightly and torn at both ends. Slightly delaminated.
Context 242; Find No 35a; Phase 3a

10 Offcut Length 50 mm; width 3-5 mm; thickness 1 mm
Offcut strip with cut edges, tapering, and torn at both ends. Slightly delaminated.
Context 242; Find No 35b; Phase 3a

Ceramic roof furniture

Thirteen fragments of glazed ceramic roof tile and a possible finial fragment were recovered from Plots A and B, all except one tile fragment coming from Phase 3. This evidence may indicate the presence of a high status building on or near this site in the 13th or 14th century. Although it is probable that the roofs of many medieval urban buildings were thatched with straw, rushes or heather, larger town houses with more substantial walls would have had tiled roofs. Evidence from the excavations at Perth High Street indicates that the roofs of the buildings excavated there may have been selectively tiled (Bogdan and di Falco forthcoming).

Although the tile fragments are small, most appear to be from curved tiles (eg No 11), and their fabric is moderately coarse, orange to red where oxidised and grey where reduced. Inclusions in the fabric include grog (crushed, previously fired tile fragments), angular and sub-angular quartz and orthoclase fragments, occasional iron mineral fragments and mica. Both grog and angular quartz would have been deliberate additions to the fabric, serving as opening materials to reduce shrinking and breakage during the drying and firing processes. Mica would have been naturally present in the clay. Thicknesses range from 11 to 18 mm.

A domed, circular piece from a deposit containing redeposited midden material in Plot B (No 12) may represent part of a decorative roof finial, possibly the terminal knob. Its fabric and glaze are very similar to that of the roof tile fragments. Decorative terminal knobs from louvers and roof finials are known from other sites, for example High Street, Southampton, where one is dated to the mid-13th century (Dunning 1975, 189, Fig 212, No 1394).

11 Roof tile Surviving length 141 mm; max width 82 mm; thickness 18 mm
Fragment from a curved tile with one surviving straight edge. The fragment has a grey, reduced core and orange to red surfaces. The convex surface bears a green glaze. Slightly abraded. (Not illustrated)
Context 181; Find No 43; Phase 3a

12 Finial fragment? Height 33 mm; max diameter 43 mm
Possible finial fragment, of domed, hollow form, flaring slightly at the base, where it is broken. The orange fabric has an external green to brown glaze.
Context 257; Find No 44; Phase 3a

Glass

Nine fragments of glass were found in the later deposits on the site. Eight are of vessel glass; the remaining piece is of recent window glass. Probably the earliest among the group is a fragment from an infill deposit in Plot A, from a wine bottle of 18th-century date. This piece exhibits a heavy, flaking patina and has abraded surfaces.

Architectural stonework

The items of worked stone from the excavation include a rectangular slab, possibly representing a remnant of a floor surface (No 13) and a possible window sill fragment, re-used as a threshold in the southern wall of Structure 2 (No 14). Both of these were found in Plot B.

13 Floor slab Length 754 mm; width 347 mm; thickness 38 mm
Stone possibly utilised as flooring, roughly rectangular in outline. The long edges are parallel, although the ends are only roughly shaped. One long edge is slightly bevelled. (Not illustrated)
Context 126; Find No 46; Phase 4b

14 Sill fragment? Length 824 mm; width 303 mm; thickness 152 mm
Fragment with one squared and bevelled edge and a dressed upper surface incorporating a small step running parallel to the long edges. Linear toolmarks survive on this upper surface. (Not illustrated)
Context 172; Find No 47; Phase 2

Stone objects

No 15 is a roughly-fashioned, discoid object, recovered from infill or levelling deposits lying on top of the cobbled Murraygate surface in Phase 4b. It may have served as a lid for a ceramic vessel or possibly as a gaming counter. A very similar artefact was found at Linlithgow Palace (Caldwell 1996, 864, Illus 28, No 146).

15 Disc Diameter 58 mm; thickness 20 mm
Roughly circular discoid object, derived from medium-grained, grey to pink micaceous stone. One face is flat, while the opposite face is more uneven and chipped. The object tapers slightly.
Context 141; Find No 40; Phase 4b

Stone roof slates

A small group of twelve roof slate fragments was recovered. Roof slates would have been hung from wooden laths and have nail or peg holes for this purpose, with diameters ranging from 10 to 16 mm among this group, in most examples drilled from both

faces. They would also have been graded, increasing in size from the roof ridge to the eaves.

The slates came from Phases 3a to 4b, and from all three plots. No 16, from the foundation for a wall belonging to Structure 6, is an almost complete slate bearing traces of mortar on both faces. Slates would have overlapped when in use, and this example has mortar on only the upper third of one face, where the overlying slate rested. The mortar helped secure the slates, and probably also helped to make the roof structure more waterproof. No 17, from a levelling deposit in Plot B, is a smaller slate. The one surviving edge indicates that it may have had a sloping shoulder, whereas No 16 has roughly right-angled corners. Roof slate fragments were also recovered from the recent excavation on Nethergate, Dundee (Cox 1998, 192).

16 Roof slate Length 362 mm; max width 178 mm; thickness 12 mm
Almost complete slate of elongated rectangular form, derived from medium-grained micaceous stone. A circular nail or peg hole is located 36 mm below the upper edge of the slate and has been drilled from both faces. The slate broadens slightly towards its base, its width increasing steadily from 171 mm near the upper end to 178 mm at the base. Traces of coarse, buff to white mortar survive on both faces. (Not illustrated)
Context 163; Find No 41; Phase 4b

17 Roof slate Surviving length 74 mm; surviving width 121 mm; thickness 9 mm
Slate fragment with broken, irregular edges apart from one possibly original edge at the shoulder. A roughly circular nail or peg hole is located 30 mm from the surviving upper edge of the slate and has been drilled from both faces. (Not illustrated)
Context 137; Find No 42; Phase 4b

Clay pipes

Dennis Gallagher

The 11 fragments of clay tobacco pipe from the excavation all appear, on the evidence of the stem bore size, to be pre-1800 in date, with the exception of one, unstratified, stem fragment. Three bowls were recovered from Context 105. Two of these (Nos 18 and 19) were biconical bowls of *c* 1640–65. These are low quality export products, with little or no milling and no decoration. Another (No 20) with an adjoining stem, is an unusually tall, heavy form for a Dutch bowl. Similar bowls are recorded from Groningen (Tupan 1988, 100 and 103; Duco 1981, 259, No 233).

From the early decades of the 17th century, Dundee merchants had included pipes among their varied imports from the Netherlands. Goods from Holland and Zeeland, plundered from a Dundee vessel wrecked in 1635 near Dunbar, included seven barrels of pipes (Martin 1987, 185). The present group, although small in number, emphasises the strong trade links between Dundee and the Netherlands in the 17th century.

18 Bowl
Biconical bowl, bottered; *c* 1640–65. (Not illustrated)
Context 105; Phase 4b

19 Bowl
Biconical bowl, bottered and partly milled; *c* 1640–65. (Not illustrated)
Context 105; Phase 4b

20 Bowl
Tall, unused bowl, bottered and partly milled, and adjoing stem. The bowl has a fleur-de-lis basal stamp. Stem bore 7/64". Dutch; possibly Groningen, *c* 1660–80. (Not illustrated)
Context 105; Phase 4b

Faunal remains

Catherine Smith

Environmental remains consisting of plant and animal material were recovered by hand-excavation on site and by sieving of soil samples in the laboratory. The methodologies used in the recovery and identification of environmental material discussed here and in the Fish and Plant Remains reports (Cerón-Carrasco, Hastie and Holden below) are fully described in the site archive, where supporting data may also be found.

Animal bones were recovered both by hand excavation and by sieving of selected soil samples, although the greatest number of fragments was recovered by hand. This report is therefore mainly concerned with the hand-excavated sample, unless otherwise stated.

Species present: vertebrates

The bones recovered from the hand-excavated sample were generally in a good, well-preserved condition, although a small proportion were abraded. The following remarks apply mainly to the hand-excavated sample, although a small quantity of mammalian, fish and molluscan fragments was also recovered from the sieved samples. Mammalian species represented by the bones were mainly domestic animals: cattle, sheep/goat, pig and cat. Only one wild mammal, the brown hare (*Lepus capensis*) was recorded. Bird species were the domestic fowl (*Gallus gallus*) and goose species, most probably the wild pinkfooted goose (*Anser cf brachyrhynchus*). A small number of other anatid fragments may have come from this species or from greylag/domestic goose (*Anser anser*).

The numbers of hand-excavated bones identified are shown in Table 2, arranged by site phase. Evidence from pottery spot-dates indicates that material from Phases 1 and 2 probably dates to the 12th century, that from Phase 3 to the 13th century and that from Phase 4 to the 14th/15th centuries. Phase 5 material has suffered from some modern disturbance. Most of the bones came from Phases 3a and 4b; it should be noted, however, that the sample sizes in all phases are fairly small and it is therefore necessary to be cautious when drawing inferences from this material.

Apparently, cattle and sheep/goat were the most abundant animals at the Murraygate site. Because of the small sample sizes involved it is not possible to be certain whether cattle were definitely more numerous than sheep, as it would appear from the available data. On other Scottish urban sites of medieval date, cattle are frequently found to be more numerous both in terms of fragment count (as in Table 3) and in terms of minimum numbers of animals. Remains of sheep are always abundant at Scottish urban sites, though usually less numerous than cattle in the medieval period. Generally speaking, for urban sites on the north-eastern seaboard, there is no shift in the emphasis towards sheep until the later post-medieval period. The results from Murraygate are therefore not at odds with the general trends in the medieval and post-medieval periods.

Comparison between the Murraygate site with another site in Dundee, on the Nethergate (Green's Playhouse; Smith, 1998) indicates a marked similarity as regards the relative abundance of cattle, sheep and, particularly, pigs (see Table 3). The percentage of cattle bones at the Murraygate does seem to be lower than at the Nethergate, but as stressed above, this may be a factor of the small sample size.

Size of animals

Anatomical measurements made on the long bones of cattle and sheep from Phases 1–4 indicate animals of a small stature, typical of medieval and post-medieval Scotland. Cattle were of a short-horned variety; there was no evidence that any of the beasts were polled or hornless. In addition, all of the horned cattle present were either females or castrates.

A radius from a sheep in Phase 4b was complete and from this bone it was possible to estimate the withers height of the live animal. This was estimated to be approximately 51 cm (calculated using Teichert's (1975) factors). As a comparison, the Murraygate animal is very similar in stature to a Soay sheep (a small, primitive spindly-legged breed).

Species present: invertebrates

Shells of marine mollusca were also found, mainly in the hand-excavated sample. Most common in all of the site phases were shells of oyster (*Ostrea edulis*). Other bivalve molluscs found at the site were cockle (*Cerastoderma edule*) and mussel (*Mytilus edulis*). As their generic names indicate, these three species are all edible, and were probably part of the diet of the people who occupied the site. Wulks (*Littorina littorea*), buckies (*Buccinum undatum*) and flat periwinkles (*L. obtusata*) are edible single valve molluscs whose shells were also recovered from the Murraygate. Shells of dog wulk (*Nucella lapillus*) and spindle shell (*Neptunia antiqua*) may have come from building sand or naturally occurring deposits, as they are unlikely to have been eaten by human beings. They may have been collected accidentally with other species; *Nucella* occasionally parasitises oysters.

Table 2 *Total number of bones from each species, by Phase.*

	Phase							
	1	**2**	**3a**	**3b**	**4a**	**4b**	**5**	**total**
species								
cattle	1	7	15	15	8	38	10	94
sheep/goat	1	12	18	6	10	28	10	85
pig			3	2	4	3		12
hare						2		2
cf hare						1		1
cat					1	1		2
large ungulate		2	15	4	4	26	6	57
small ungulate		3	9	2	7	14	4	39
indeterminate mammal	2	9	26	9	9	31	6	92
domestic fowl	1				1	3		5
goose *cf* Pinkfooted (*Anser cf brachyrhynchus*)			1					1
Anatid/goose species			4					4
indeterminate bird			5		1			6
fish		2	5		9	8	1	25
total	5	35	101	38	54	155	37	425

Table 3 *Numbers and percentages of bones from main food-forming mammals from the Murraygate and Green's Playhouse sites, Dundee.*

	Murraygate (DD27) Phases 1–4b		**Green's Playhouse (DD20) Phases 1–3**	
	n	%	n	%
species				
cattle	84	50.0	174	58.4
sheep/goat	75	44.6	105	35.2
pig	9	5.4	16	5.4
horse			3	1.0
total	168	100.0	298	100.0

Conclusions

Because of the relatively small numbers of bones found in each of the site phases, it is not possible to determine any changing trends in livestock husbandry with time. However, comparison with another site of similar date within the burgh of Dundee, Green's Playhouse, has shown a consistent pattern in the relative proportions of cattle, sheep and pigs. At both sites, cattle bones dominated the assemblage, while sheep were almost as frequent. However, it has not been possible to determine whether cattle are less frequent in the Dundee assemblages than at sites in Perth, again because of sample size, although there is a suspicion that this may be so. Although ratios of numbers of cattle compared to sheep appear to be higher at some sites in Perth (particularly at PHSE and King Edward Street; see Table 3 in Smith 1996), further evidence from Dundee is required before reaching this conclusion; any differences between

animal bone assemblages from the burghs may reflect their diverse geographical locations, differing trade patterns, or merely differential preservation between sites.

The low numbers of pig bones found at both the Murraygate and Nethergate sites is worthy of mention. While both documentary and osteological evidence shows that pigs were commonly kept within the confines of the burghs, in back-yard enclosures and styes, the sheer volume of bones from the far more economically important cattle and sheep has tended to mask their presence. While both cattle and sheep produced hides, wool and woolfells, all taxable commodities which made a major contribution to the Scottish medieval export economy, as well as providing dairy products for the home market, pigs produced only their meat. Although this pork may have been saleable, preserved pig meat was mainly for local consumption and did not contribute greatly to the country's economy until the early modern period.

As well as having ready access to the meat from domestic livestock killed within the burgh, the townspeople also seem to have supplemented their diet with a variety of wild foods. A hazelnut shell from Phase 3a is evidence of the collection of nuts in season, and the variety of marine mollusc shells show that these too were collected for food. Wulks and mussels are easily gathered from the intertidal region of the rocky shores along the Firth of Tay, up to the present day. Although much land has been reclaimed from the firth, from the 17th century onwards (Stevenson & Torrie 1988, 10, 13), resulting in the loss of the original medieval coastline, it is quite likely that suitable habitats for marine mollusca were readily accessible from the site itself during the medieval period. Early evidence of exploitation of shellfish comes from a 'kitchen midden' of Mesolithic date, located about 2 km from the burgh centre, in the Stannergate. This midden, along with a number of cist burials which overlay it, was discovered during extensions to Dundee Harbour in the 19th century, and the finder noted the shells were 'principally' those of mussels, periwinkles (wulks), whelks (buckies), cockles and limpets. Oysters are not mentioned in this list, although this does not necessarily mean they were absent, given the circumstances of the hurried recording which it was necessary to make before the site was destroyed (Mathewson 1879, 303–7).

Interestingly, there are no oyster beds in the Tay at the present day, although very rarely is an archaeological investigation carried out in the medieval burghs of Dundee and Perth that does not recover oyster shells. Although it is possible that these were imported from the Forth, which supported a thriving oyster fishery up until the 19th century (Yonge 1960, 156), it is equally likely that they came from now extinct local beds in the Tay.

The fish remains from Murraygate, Dundee

Ruby Cerón-Carrasco

Methods

The fish remains from the Murraygate in Dundee were recovered by sieving through a 1 mm mesh size and by hand-collecting during the excavation. Fish remains were found in a total of 16 contexts.

Identification of species was made using modern comparative reference collections of fish bone and by reference to standard guides (Watt *et al* 1997; Wheeler & Jones 1989, 122–3).

The size of identified non-Gadoid species was calculated by comparison with modern specimens of known size. The size of the Gadidae species has been calculated by giving an approximate size range. This was done by matching the archaeological material to modern fish skeletons of known size based on 'total body length'. Therefore, the elements were categorised as 'very small' (<15 cm), 'small' (15–30 cm), 'medium' (30–60 cm) 'large' (60–120 cm) and 'very large' (>120 cm) The size of non-Gadoid species was also calculated by comparison to modern specimens of known size and were categorised as 'juvenile' or 'mature', depending on the size range.

Results

The results are presented in Table 4. The summary of species present and the NISP (Number of Identified Species) by element per phase is shown in Table 5 for the sieved material and Table 6 for the hand-collected material.

Taxonomic analysis

The assemblage comprised one freshwater species, the salmon (*Salmo salar*) of the Salmonidae family, and marine species from the cod family Gadidae, flatfishes of the Pleuronectidae family and herring of the Clupeidae family. The Gadidae were represented by haddock (*Melanogrammus aeglefinus*), cod (*Gadus morhua*), pollack (*Pollachius pollachius*) and ling (*Molva molva*). Flatfishes included dab (*Limanda limanda*) and plaice (*Pleuronectes platessa*).

Discussion by phase

Phase 2, 12th century

Only one element recovered by hand was identifiable to species level. This was a caudal vertebrae from a large ling.

Phase 3, 13th century

The sieved material produced enough fish bone elements to allow for a more accurate analysis of the fish species present in the assemblage. The main species

represented in this phase was the salmon: vertebrae from mature specimens measuring *c* 60 cm total length were recovered.

The second largest group present is the Gadidae of which haddock was the main species represented. Elements from small and medium specimens were present. Pollack was represented by small category specimens, and cod by large specimens. The elements recovered were mainly vertebrae. One fragment of maxilla assigned to a medium size category gadid was found burnt black-grey suggesting burning at high temperature, possibly during rubbish disposal.

Left-eyed flatfishes (Pleuronectidae) were represented by juvenile specimens of dab and plaice (measuring less than 35 cm total length).

Herring vertebrae were also recovered from this phase. These belonged to mature specimens of *c* 35 cm total length.

Phase 4, 14th–15th century

Cod elements from large and very large specimens were recovered by hand-retrieval. The sieved samples produced elements from small and medium haddock. Juvenile dab (<35 cm total length) and mature herring (*c* 35 cm total length) were also present.

General discussion

The main group present in the assemblage is salmon. This species may have been caught in the River Tay, where it abounds. An important fishery for these can be traced as far back as 1198 when the monks of Lindores Abbey in Fife were bestowed fishing rights on the Tay (Leitch 1991).

One of the earliest methods of fishing for salmon in the Tay river was the *yair* method. This involved building enclosures using stones, timber or close wicker work which would trap the fish in the stagnated water (*ibid.*). Another traditional way of catching salmon in the Tay was the sweep-net method, also known as 'net and coble'. The coble is a flat-bottomed boat made of bark and wood, the absence of a keel allowing it to pass over the nets without destroying them (*ibid*). Salmon was recovered only from Phase 3 at Murraygate.

The marine species present in the assemblage were from the Gadidae and the Pleuronectidae groups, collectively referred to as 'white fishes'. During the late 12th century the white fisheries were strictly burghal monopolies, controlled by the Laws of the Four Burghs. Each burgh passed regulations relating to the price, quality and selling of fish as well as building of boats and harbours and the provision of salt and of wood for barrels (Anson 1974).

Haddock was the main Gadid species identified at the Murraygate, although cod, pollack and ling were also present. All these species have a long history as important sources of food and some, in particular, cod and haddock, may have been consumed either as fresh or salted, dried or smoked products.

Haddock is a fish of the North Atlantic and is a very important commercial species. It lives very near the bottom but large shoals are occasionally found in mid-water, its size and quality varying with location. It attains a length of 76 cm (Wheeler 1978). Haddock do not take salt as well as cod and for this reason are mainly cured by drying and by smoking (Lockhart 1997).

In Fife and in the southern districts, most of the haddock was sold fresh, while further north it was mainly cured by smoking (Gray 1978). The Arbroath 'smokie' has been one of the most famous products of the area and its production has been basically a cottage industry. Haddock are tied in pairs with the skin on. These are then suspended on a rod over a barrel containing burning wood chips. The Arbroath 'smokie' does not require further cooking after its smoking is complete (Lockhart 1997).

Cod has been one of the most important food-fish in the British fauna; its value as a prime food is enormous and when salted or dried it keeps for winter consumption or trade. The cod is a demersal fish, a bottom feeder. Its growth rate varies with different populations; in the North Sea, cod can grow to an average length of 18 cm in their first year, 36 cm in their third year and 68 cm in their fourth year. A mature cod can reach 150 cm in length. This species is widely distributed in a variety of habitats from the shoreline to well down the continental shelf. The younger fish, however, usually live close inshore (Wheeler 1978).

On the east coast , fishing for small specimens such as immature haddock, saithe and pollack was done in inshore waters. This activity was in practice for most of the year but most particularly in autumn and winter (Gray 1978). The fishermen of the east coast would also engage, for a great part of the year but especially during spring, in the pursuit of cod and ling which were taken offshore from boats using hooked lines (*ibid*).

Herring (*Clupea harengus*) was present in Phases 3 and 4. The herring has been one of the most important species in the history of fishing in Scotland. Fishing of herring can be traced over centuries with documents showing an early export trade (Lockhart 1997). The main source in which herring is recorded is the Exchequer Rolls, where they are prominent from the 13th century onwards (Coull 1996).

The migratory habits of the herring are unusual. Scotland is particularly fortunate in relation to its movement, since the East Coast benefits from the herring migrating from overwintering grounds near Norway. As a food source, herring is more nourishing and contains more essential vitamins and minerals than any other fish, flesh or fowl. Herring is a fatty fish and cannot be cured by simple salting and drying or it would soon become rancid. Heavy salting and smoking over a wood fire are needed if it is to be transported over long distances (Lockhart 1997).

Dab, a right-eyed flatfish (Pleuronectidae), live over sandy ground and are found inshore all year round.

Table 4 *Hand-retrieved fish remains*

context	element	number	species	size	comments
108	branchiostegal	1	Gadidae	large	fragment < 20–cm
114	branchiostegal	1	Gadidae	medium	fragment < 10–cm
128	hyomandibular	1	Gadidae	large	medial
154	articular/right	1	cod	very large	proximal
	fragments	5	unidentifiable	unknown	< 15–cm
168	caudal vertebra	1	cod	large	
	supraclavicle	1	cod	large	proximal
	urohyal	1	Gadidae	large	
200	parasphenoid	1	Gadidae	medium	medial
	branchiostegal	1	Gadidae	medium	fragment < 10–cm
221	branchiostegal	3	Gadidae	medium	fragments < 10–cm
242	fin rays	1	Gadidae	large	fragment < 20–cm
	ceratobranchial	1	Gadidae	large	
257	spine	1	Gadidae?	medium?	< 10–cm
249	caudal vertebra	1	ling	large	
	branchiostegal	1	Gadidae	large	fragment < 15–cm

Fish remains recovered from sieved material

context	element	number	species	size	comments
170	caudal vertebra	1	haddock	small	
	precaudal vertebra	1	haddock	small	
	ceratohyal	1	Gadidae	small	medial
	caudal vertebra	1	dab	juvenile	
	caudal vertebra	1	herring	mature	
	fragments	30	unidentifiable	unknown	< 10–cm
175	ceratobranchial	1	Gadidae	Small	
	fragments	5	unidentifiable	unknown	< 5–cm
193	fragment	1	unidentifiable	unknown	< 10–cm
200	caudal vertebra	1	cod	large	
	caudal vertebra	2	haddock	medium	
	precaudal vertebra	1	haddock	medium	
	caudal vertebra	1	pollack	small	
	precaudal vertebra	1	pollack	small	
	maxilla	1	Gadidae	medium	proximal/burnt-black-grey
	precaudal vertebra	1	dab	Jjvenile	
	caudal vertebra	1	herring	mature	
	precaudal vertebra	2	herring	mature	
	precaudal vertebra	3	salmon	mature	
	caudal vertebra	4	salmon	mature	
	fragments	10	unidentifiable	unknown	< 10–cm
229	caudal vertebra	1	plaice	juvenile	
	articular	1	Pleuronectidae	juvenile	proximal
	quadrate	1	Pleuronectidae	juvenile	proximal
	post temporal	1	Pleuronectidae	juvenile	proximal
236	fragments	10	unidentifiable	unknown	< 10–cm

Conclusion

The fish remains from Murraygate, Dundee, provide an important insight into specialised fishing for salmon during the 13th century probably from the Tay, as well as an important marine white fisheries industry with haddock, pollack, cod and ling being exploited as well as flatfish. Gadids were well-represented during the 13th century, (Phase 3) and to a lesser extent during the 14th–15th century (Phase 4) at Murraygate. Herring also appears to have been an important fish food resource particularly in Phase 3. The presence of ling in Phase 2 is indicative of a long tradition of an offshore fishing industry in the area.

Table 5 *Hand-retrieved fish species represented (NISP)*

	Phase 2	Phase 3	Phase 4	Phase 5
species				
Gadidae	1	4	7	1
cod			3	
ling	1			

Table 6 *Sieved samples, fish species represented (NISP)*

	Phase 2	Phase 3	Phase 4
species			
Gadidae		1	2
cod		1	
haddock		3	2
pollack		2	
Pleuronectidae		3	
dab		1	1
plaice		1	
herring		3	1
salmon		7	
unidentified	1	25	35

The plant remains

Mhairi Hastie and Dr T Holden

Environmental samples were taken from a number of well-preserved floor deposits underlying building walls from Plots B and C. Initial assessment showed that the majority of samples contained substantial amounts of carbonised material while three samples also contained un-charred plant remains preserved by waterlogging.

Seven samples were fully sorted and the results are shown in Table 7. All identifications were made with reference to the modern comparative collection of Headland Archaeology Ltd and seed atlases (Berggren, 1969 and 1989). Botanical nomenclature broadly follows that of the *Flora Europeae* (Tutin *et al*, 1964–80).

Results

Cereals

The most common component was cereal grain. Barley, oat, wheat and rye were all present. Grains of oat were most frequently encountered and their preservation was good. Most grains could only be identified to the level of *Avena* sp., however, a small number were still enclosed within the lemma and palea (florets). It was thus possible to distinguish between *Avena strigosa* (small/bristle/black oat), *Avena sativa* (common oat), the two main cultivated British species, and *Avena fatua* (wild oat). One grain of wild oat was identified from Context 229 and five grains were identified as *Avena sativa* from Context 170, 217 and 236. The majority, however, were identified as *Avena strigosa*—the black oat. This implies that the bulk of the naked grains were also of this species.

Grains of wheat were present in all seven samples. Overall morphology was typical of *Triticum aestivo-compactum* (bread/club wheat). Chaff fragments were rare with only two samples containing a small number of rachis internodes (five in total). These were poorly preserved and could only be used to distinguish between *T. aestivum* and *T. compactum*.

Barley and rye grains were also recovered, though not in the same numbers as the oat and wheat. The barley grains were generally well preserved and the majority could be identified as the hulled variety. Straight (symmetrical) and twisted (asymmetrical) grains were identified where preservation allowed. A ratio of 1:1 straight to twisted was recorded, indicating that both the two-row form and the six-row variety were present. No barley chaff was recovered. The rye grains were mostly present in low quantities although one sample (Context 229) did contain more than a hundred grains. A small number (four in total) of rye rachis internodes were also recovered.

Wild species

The seeds of wild or weedy species were present in low concentrations in all of the samples, with elevated concentration in those contexts containing large numbers of grain. Both carbonised and waterlogged weed seeds were recovered. The most commonly encountered were members of the Gramineae (Grasses), *Spergula arvensis* (corn spurrey), *Agrostemma githago* (corn cockle), *Galeopsis tetrahit* agg. (common hemp-nettle), *Rumex* sp. (dock), and *Raphanus raphanistrum* (charlock). Corn cockle is specifically associated with cultivation while most of the others are common elements in cultivated fields. The majority of seeds were therefore probably growing as weeds in the cereal fields along with the crop and brought to the site as contaminants. Species such corn spurrey and charlock are indicative of acid soils with a good nutrient supply.

Table 7 *Plant remains from 27–35 Panmure Street and 72–8 Murraygate, Dundee.*

key + rare fragments			PLOT B	
		context no.	200	229
		sample no.	25	15
		vol. (litres)	10	10
		sample description	beneath paved area	charcoal depos
Latin name	**plant part**	**common name**		
		moss indet.		
Corylus avellana L.	nutshell	hazel		+
Urtica dioica L.	seed	stinging nettle		
Polygonum sp.	nutlet	knotgrass		
Polygonum persicaria/lapathifolium L.	nutlet	persicaria/pale persicaria		1
Polygonum aviculare agg.	nutlet	knotgrass		
Bilderdykia convolvulus (L.) Dumort.	nutlet	black bindweed		
Rumex sp.	nutlet	dock		1
Chenopodium album L.	nutlet	fat hen		
Atriplex sp.	nutlet	orache		
Spergula arvensis L.	seed	corn spurry		
Stellaria media (L.) Vill.	seed	chickweed		
Agrostemma githago L.	seed	corn cockle		4
Raphanus raphanistrum L.	siliqua	charlock		
Raphanus/Brassica sp.	seed	cabbage family		
cf. Rosaceae	berry	rose family		
Potentilla sp.	achene	cinquefoil		
Vicia/Lathyrus sp.	seed	vetch/pea		19
cf. Pisum sativum	seed	cultivated garden pea		3
Linum usitatissimum L.	seed	cultivated flax		
Calluna vulgaris (L.) Hull	florets and buds	ling, heather	+	+
Euphorbia helloscopia L.	fruit	sun spurge		
Galium aparine L.	fruit	goosegrass/cleavers		5
Galeopsis tetrahit agg.	nutlet	common hemp-nettle		2
Hyoscyamus niger L.	seed	henbane		
Centaurea nigra L.	achene	lesser knapweed		1
Crepis mollis (Jacq.) Aschers.	achene	soft hawk's-beard		
Gramineae (large grained)	caryopsis	larged grained grass	4	
Gramineae (medium grained)	caryopsis	medium grained grass		
Gramineae (small grained)	caryopsis	small grained grass		4
Carex sp.	nutlet	sedge		3
indeterminate	seed			6
cereals				
Triticum aestivo-compactum	caryopsis	bread/club wheat	4	289
cf. Triticum aestivo-compactum	caryopsis	bread/club wheat		5
Triticum aestivo-compactum	rachis internodes	wheat		
Hordeum sativum indet.	caryopsis	barley indet.	3	44
cf Hordeum sativum	caryopsis	barley indet.		
Hordeum sativum (hulled)	caryopsis	hulled barley	1	34
Hordeum sativum L. (hulled - straight)	caryopsis	hulled barley		2
Hordeum sativum L. (hulled - twisted)	caryopsis	hulled barley		
Secale cereale L.	caryopsis	rye	2	152
cf. Secale cereale L.	caryopsis	rye		
Secale cereale L.	rachis internodes	rye		4
Avena fatua L.	caryopsis	wild oat		1
Avena strigosa Schreb.	caryopsis	bristle-pointed oat		17
Avena sativa L	caryopsis	cultivated oat		2
Avena indet	caryopsis	oat	10	373
cf. Avena indet.	caryopsis	oat	3	58
Cereal indet.	caryopsis	cereal indet.		90
Total number of cereals			23	1067
Total number of weed seeds			4	42
Total number of chaff fragments			0	4
Total number of plant remains			27	1113
Percentage of cereals (%)			85	95
Percentage of weed seeds (%)			15	4
Percentage of chaff fragments (%)			0	1
Density: cereal grains per litre			2.3	106.7

PLOT B

170	193	193	217	236	236	239	239
2	6	6	12	18	18	20	20
10	4	1	5	5	1	5	1
dark deposit under wall	floor deposit	floor deposit	floor deposit	floor deposit	floor deposit	floor deposit	floor deposit
		waterlogged			**waterlogged**		**waterlogged**
					+		+
+			+			+	+
					1		
2			1			1	
2	3	3	8		9	13	2
							1
		1			1		
1			5		11		3
		13					
					1		1
9							
		1			3		2
	2	1					
						3	
					1		1
						1	
							1
14					1		
						1	
+	+		++			+	
						1	
2							
1							
		1					
			1				
3							
2		1					
3		4				1	1
3	2		1	1		6	
11	51		15	6		4	
	7					1	
	3		2				
33	3		4	2		1	
5			1	1			
18	2			1		70	
				2		1	
1						5	
8	1						
4	2						
6			2			19	
	2					1	
53	2		6	8		40	
21							
	13			2			

160	83	28	22	142
42	7	16	1	26
0	3	2	0	0
202	93	46	23	168
79	89	61	96	85
21	8	35	4	15
0	3	4	0	0
16	20.75	5.6	4.4	28.4

The presence of *Calluna vulgaris* (heather) and *Carex* sp. (sedge) in some samples must derive from a different source, possibly as flooring, thatch or the turf used as fuel or for building purposes and taken from areas of acid heath. The waterlogged seeds are more likely to have been found growing around the site. Certainly *Stellaria media* (chickweed), *Crepis mollis* (soft-hawk's beard), *Urtica diocia* (stinging nettle) and *Hyoscyamus niger* (henbane) are all commonly found in areas of nitrogen-rich disturbed ground.

Other potential economic species

One flax seed (*Linum usitatissimum*) was found in a sample from a floor deposit (Context 239). Flax can be used to produce edible oil or fibres for the spinning of linen. It has been recovered from a number of Scottish archaeological sites dating back to the Neolithic (Fairweather and Ralston, 1993) and its presence at Murraygate indicates that this important resource was being utilised within the area. The single seed, however, offers little scope for analysis other than to note its presence.

Three seeds, possibly from *Pisum sativum* (cultivated pea), were identified from Context 229 (charcoal deposit). Documentary evidence indicates that the pea was cultivated throughout the medieval period (Greig, 1991) and a small number have been recovered from other archaeological sites. The quantity recovered, and poor preservation, limit any further detailed assessment.

Small fragments of hazelnut shell (*Corylus avellana*) were also present in six of the samples. Hazelnuts have been used as a food source since the Neolithic, nevertheless, they could have also been brought to the site as part of wood collected for fuel rather than harvested specifically for consumption.

Discussion

The samples were collected from two different plots: Plot B (Contexts 200 and 229) and Plot C (Contexts 170,193,217,236 and 239).

Overall preservation of the cereals was good with most samples containing a relatively high number of grains.

Plot B Structure 2: charcoal spread

Context 229 contained substantial quantities of cereal grains—black oat, bread/compact wheat, hulled barley and rye. The weed seed element is small and generally consistent with that of arable ground. The high proportion of grain to weed seeds and chaff indicate that the cereal remains probably represent crops from which the coarse chaff, straw fragments and the majority of weed seeds have been removed through winnowing and sieving (Hillman, 1981). A relatively high proportion of the grain was oat, of which a proportion was still held within the hulls. The implication, therefore, is that this was a cleaned crop, some of which had not been fully processed in order to remove the hulls.

Context 200 is less concentrated but similar to Context 229 in terms of relative concentrations of the different components. It would be entirely feasible that the charred assemblage from Context 200 represents reworked material from the more charcoal-rich Context 229.

Plot C: floor deposits

The samples taken from the floor deposits and one sample from underneath a wall of Structure 5, within area C (Context 170) are similar in composition to that recovered from Structure 2 in Plot B, with the four main cereal crops being present. The concentration of the remains is however, much lower than in the charcoal spread from Context 229. The weed seed assemblage is very small and only five poorly preserved wheat rachis internodes are present.

Three of the floor deposits contained waterlogged seeds and two of these also contained highly fragmented burnt bone (Contexts 236 and 239 in Structure 3). This would be consistent with a well-trodden floor, with small amounts organic material or trample added from an external source. From the waterlogged samples it is clear that the less robust seeds have been lost from the archaeological record with only the more robust seeds surviving. The loss of the more delicate plant material and the insect remains is suggestive of a surface which may not have been permanently waterlogged. Any waterlogged remains could therefore relate to an abandonment phase rather than use.

General comments

The samples analysed here were all of similar composition although concentration of the remains was variable. All four of the primary medieval cereal crops are represented—oat, bread/compact wheat, hulled barley and rye. The samples are dominated by oat, primarily the black oat, with lesser quantities of wheat, rye and barley. Few weed seeds and chaff fragments are present. This site therefore fits into a well-established pattern for the east coast of Scotland (Boyd, 1988).

Context 229 contained the highest concentration of plant material on the site and may prove to be the context that is closest to the original source of much of the charred material encountered. The presence of the four cereals, together with possible pea and flax, indicates a mixed assemblage. The most likely occasion on which these would become charred are a) in a catastrophic destruction of storage facilities by fire or b) during processing, primarily drying, on household fires or in ovens/kilns. The evidence produced during excavation does not enable us to distinguish between these two possibilities. The concentration of grain from Context 229 might, however, argue against a purely domestic accident. It would seem likely that the fire in

which the grain became charred (i.e. the kiln or barn that burnt down) lies outwith the excavated area.

Discussion and conclusions

Mike Roy

The occupation history of the northern end of the Murraygate, with the various buildings fronting on it, was uncovered during these excavations, with a sequence of constructions, repairs, infillings, extensions and demolitions, commencing in the 12th century. There was a notable lack of post-medieval evidence, apart from residual material such as 17th-century clay pipe bowls (recovered from Phase 4b context 105). The most noteworthy features of this sequence were probably the shift from timber (wattle and daub) to stone buildings between the 12th and 15th centuries, and the raising of the level of the Murraygate (during Phases 3a, 3b and 4b). The latter was possibly a reaction to drainage problems probably caused by the proximity of marshlands (the Meadows) as noted above (McKean and Walker, 1993, 38). The difficulties of adequate drainage were further suggested by the construction of later walls at a greater height than earlier ones, with foundations in Phase 4b overlying previous walls. During this phase many drainage features were inserted in Structure 6, and a culvert was also present in Structure 2 during phase 2. The drain located in the Phase 3b Murraygate surface was a further sign of the importance of drainage.

The laying out of burgage plots along the Murraygate from the 12th to 14th centuries was clearly evinced. Occupation apparently spread from south (plot 'C') to north (plot 'A'), towards the northern town limits, which probably lay just beyond the area of excavation. The stone buildings uncovered in Phases 2 to 4b had substantial walls, and may well have been high status dwellings. This was further indicated by high quality roofing material from phase 3 and 4 contexts—notably a possible ceramic finial fragment (Cox, see above [Find No. *12*]) from Phase 3a midden dump 257 in Structure 2, and the glazed ceramic roof tile fragments, mainly from phase 3 contexts. This supports the idea that this part of the medieval town was occupied by members of the wealthy burgess class.

Several finds from Phase 3a contexts produced evidence of possible local industry. An iron axe head from organic deposit 200 in Structure 2 was apparently a carpentry tool (Cox, see above [Find No. *2*]), and midden infilling 242 of Structure 3 contained leather offcuts and scraps (Cox, see above [Find No. *35a and b*]). It is possible that Structure 3 may have functioned as a workshop.

No signs were found of the stone defensive wall of 1592, leading to the re-interpretation of the supposed robbed-out defensive wall encountered in trial trenches DD 26 B and C as remnants of walls from domestic buildings, such as wall 133 of Structure 7. It is probable that the town wall lay further north, under Panmure Street.

The width of the Murraygate narrowed between the 15th and 19th centuries, as frontages extended further east. This may reflect the encroachment of forebooths into the street in the late 18th and 19th centuries (Stevenson and Torrie, 1988, 64). Though no evidence was found on any of the structures for the typical pillared wooden fronts of such forebooths, it seems likely that the extended frontages of Structures 7 and 8 represented consolidations of such features. The erection of Structures 7 and 8 during Phase 5 probably resulted in the loss of post-medieval deposits. These structures were probably those built between the drawing of the OS maps of 1871 and 1902.

The site has produced a great deal of information regarding the medieval occupation of the burgh, and the domestic structures of the 12th to 15th centuries. The artefacts and animal bone located in many of the midden and floor deposits will enhance our understanding of the medieval town—previously few artefacts had been recovered from waterlogged medieval contexts in Dundee. Smith notes above that cattle and sheep bones dominated the domesticated mammal remains, as at the nearby site at Green's Playhouse. Analysis of carbonised and waterlogged plant remains from the site have shown that various cereals—oats, wheat, barley and rye—were utilised, as well as pea and flax (Hastie and Holden, see above). Meanwhile, the fish remains recovered suggest that while both freshwater and marine environments were utilised during Phase 3, with a particular abundance in salmon probably taken from the River Tay, only marine fish were certainly consumed in Phase 4 (Cerón-Carrascoabove).

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Abstract

Prior to the redevelopment of the area, an excavation was carried out by SUAT Ltd at 27–35 Panmure Street/ 72–78 Murraygate in Dundee in November and December 1998 (SUAT Site Code DD27). Three medieval burgage plots were located, with frontages on the Murraygate. The remains of structures from the 12th to 15th centuries were located, as well as four distinct medieval levels of the Murraygate. Evidence was found of a timber structure, representing pre-burghal occupation of the Murraygate. Later stone buildings show the development of the area, and the survival of such early archaeology suggests that this area has great potential for the understanding of Dundee's past. The project was funded by the developer, Scottish Mutual Portfolio Managers, and commissioned through the project architects, Douglas McConville Partnership.

Keywords
burgage plots
Dundee
frontage
medieval
Murraygate

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